United States Patent [19]

Sommer

[11] **4,090,378**

[45] **May 23, 1978**

[54] **ROUGHING MACHINE HAVING ROCKABLE SHOE ASSEMBLY SUPPORT**

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[73] Assignee: **International Shoe Machine Corporation,** Nashua, N.H.

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[30] **Foreign Application Priority Data**

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[51] **Int. Cl.**[2] **C14B 1/44;** A43D 0/00

[52] **U.S. Cl.** ..... **69/6.5;** 12/1 R

[58] **Field of Search** ..... 12/1 R, 1 A, 17 R, 17.2, 12/77, 88, 91, 92; 69/6.5

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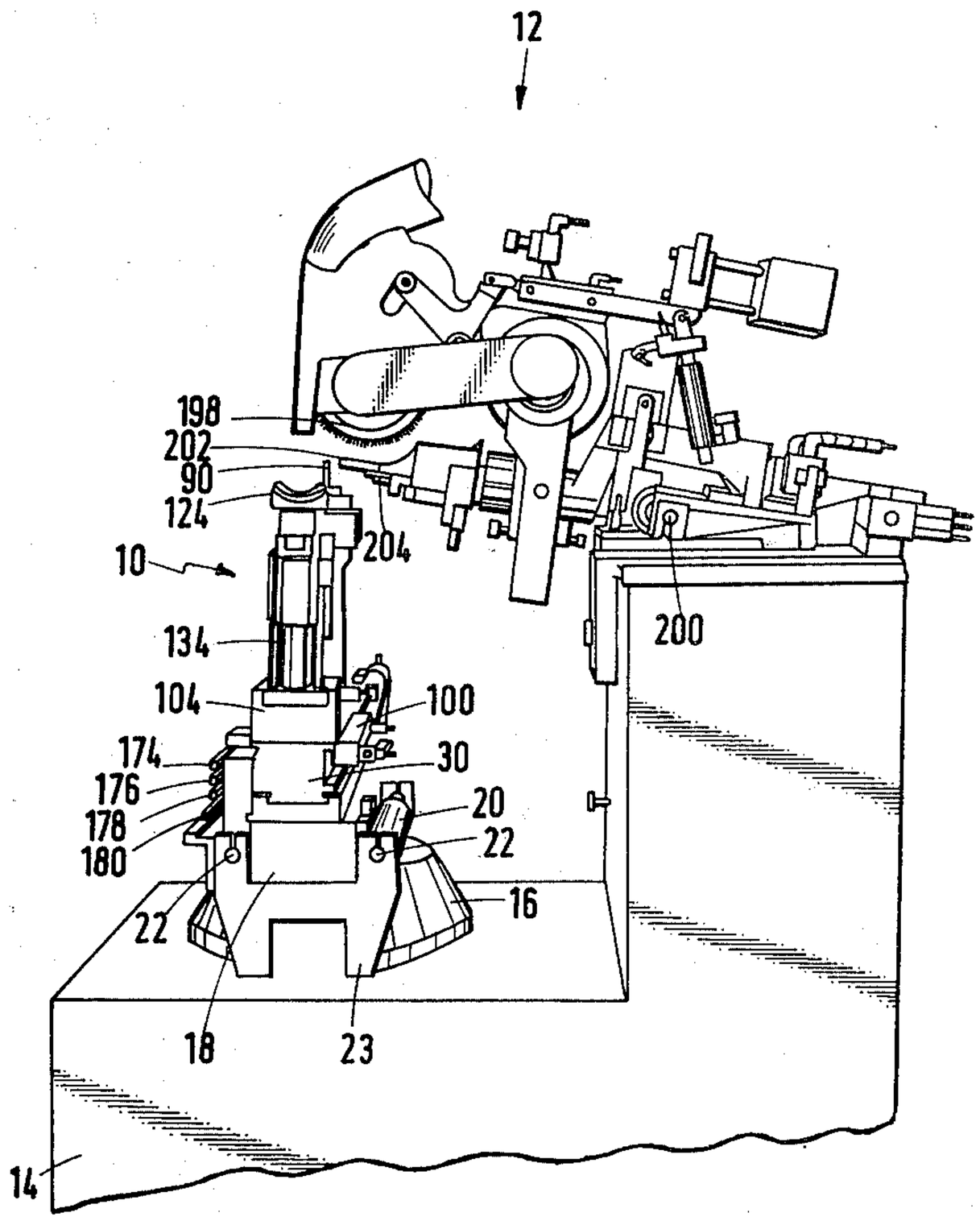
Primary Examiner—Patrick D. Lawson

Attorney, Agent, or Firm—Albert Gordon

[57] **ABSTRACT**

A roughing machine operable to rough the margin of an upper of a shoe assembly that comprises a last having an insole located on its bottom and the upper mounted thereon with the upper margin lying against and being secured to the bottom of the insole. The shoe assembly is supported bottom-up on a shoe assembly support and the shoe assembly support is so moved as to move succeeding portions of the upper margin past a roughing tool. During this movement of the shoe assembly support, the shoe assembly support is caused to rock to thereby rock the shoe assembly.

7 Claims, 17 Drawing Figures



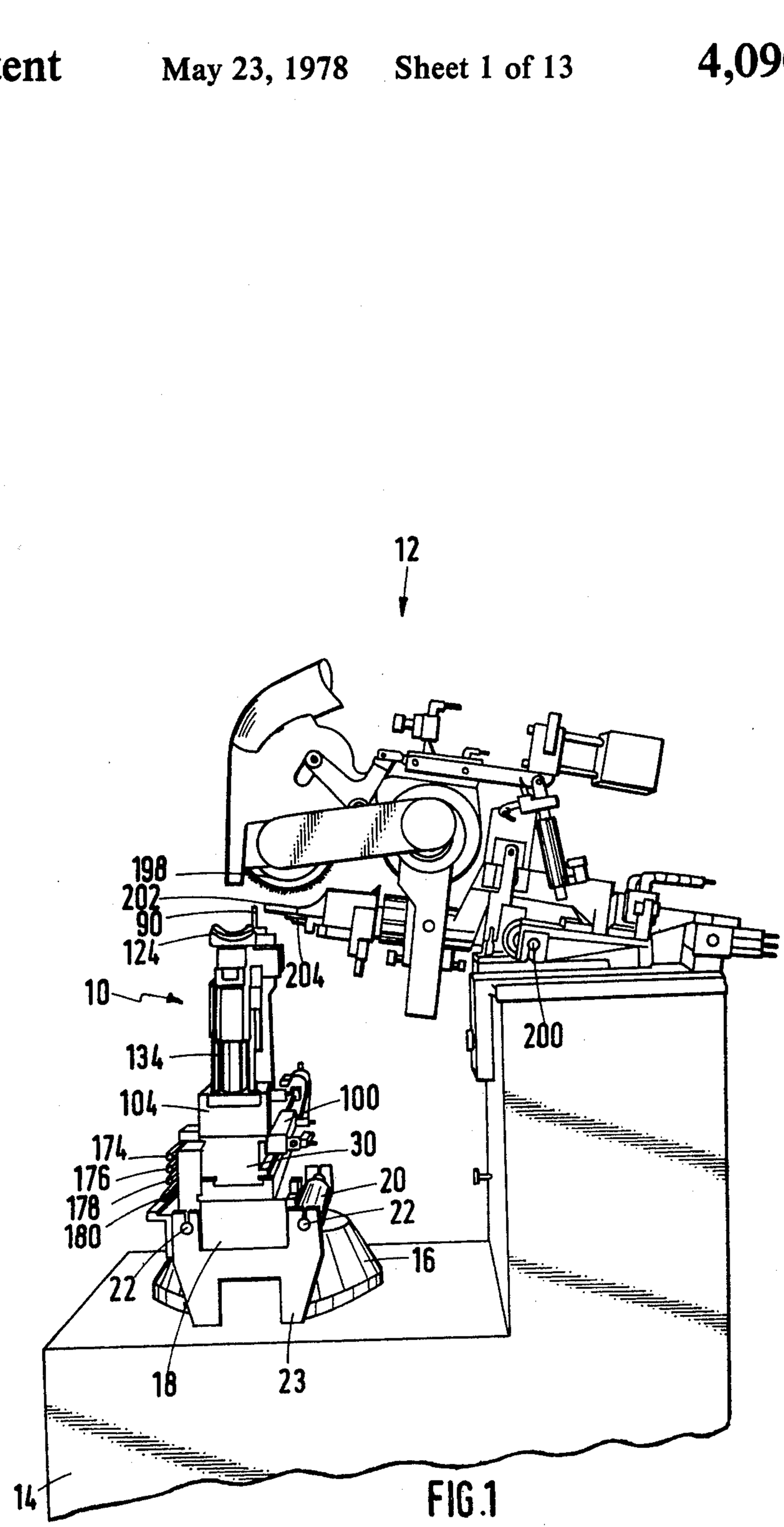

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FIG.1

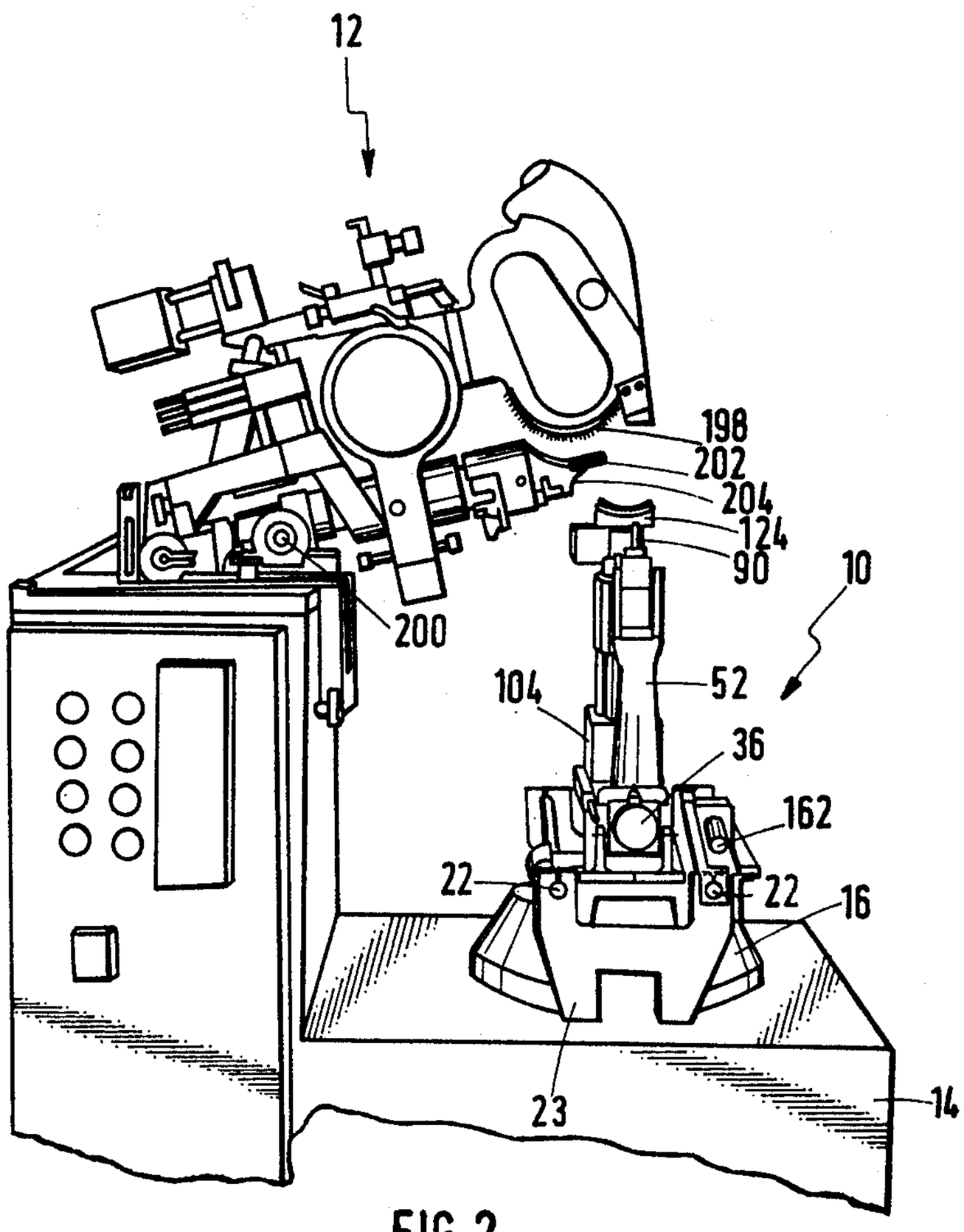

FIG.2

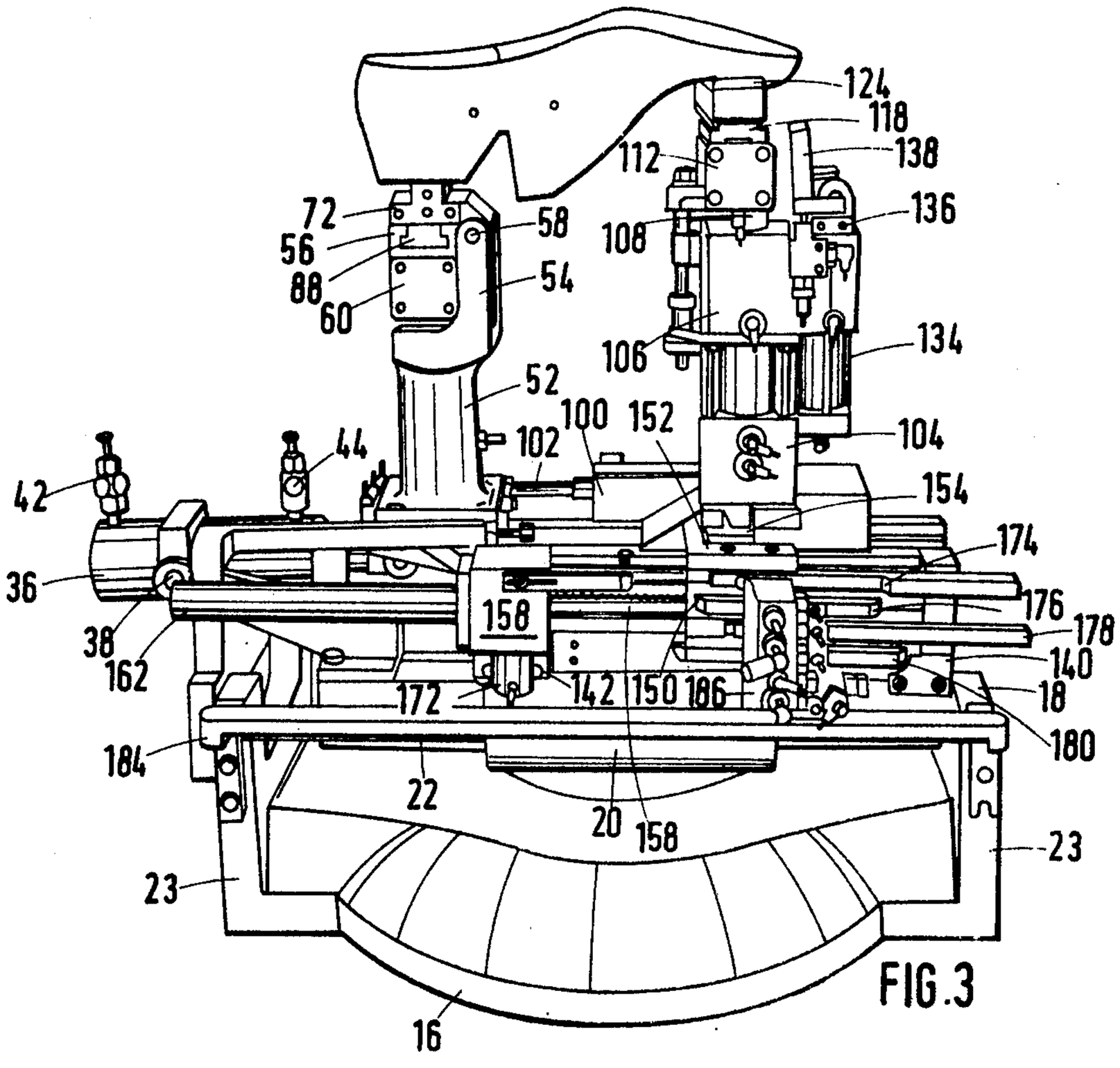
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FIG.3

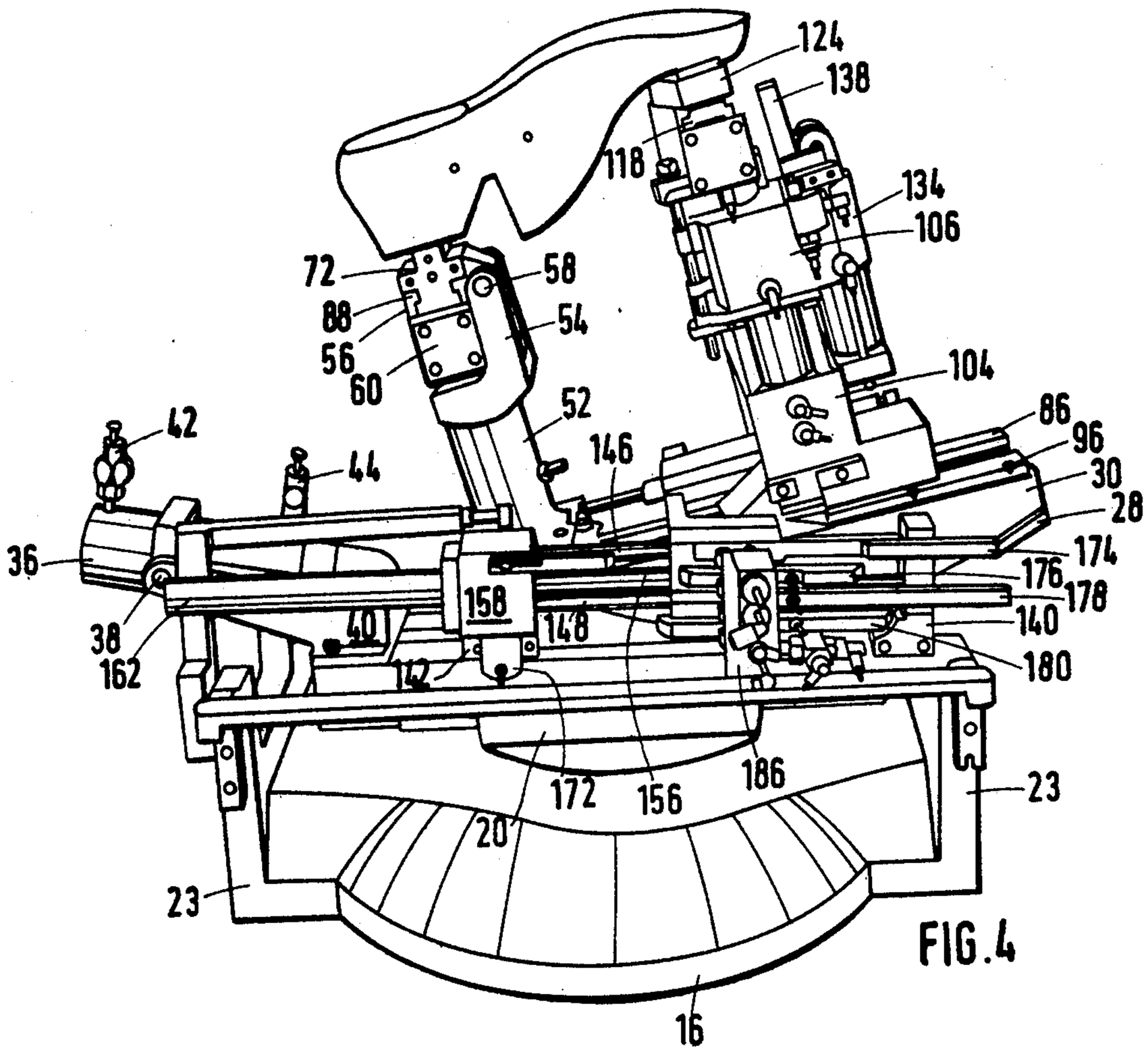
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FIG.4

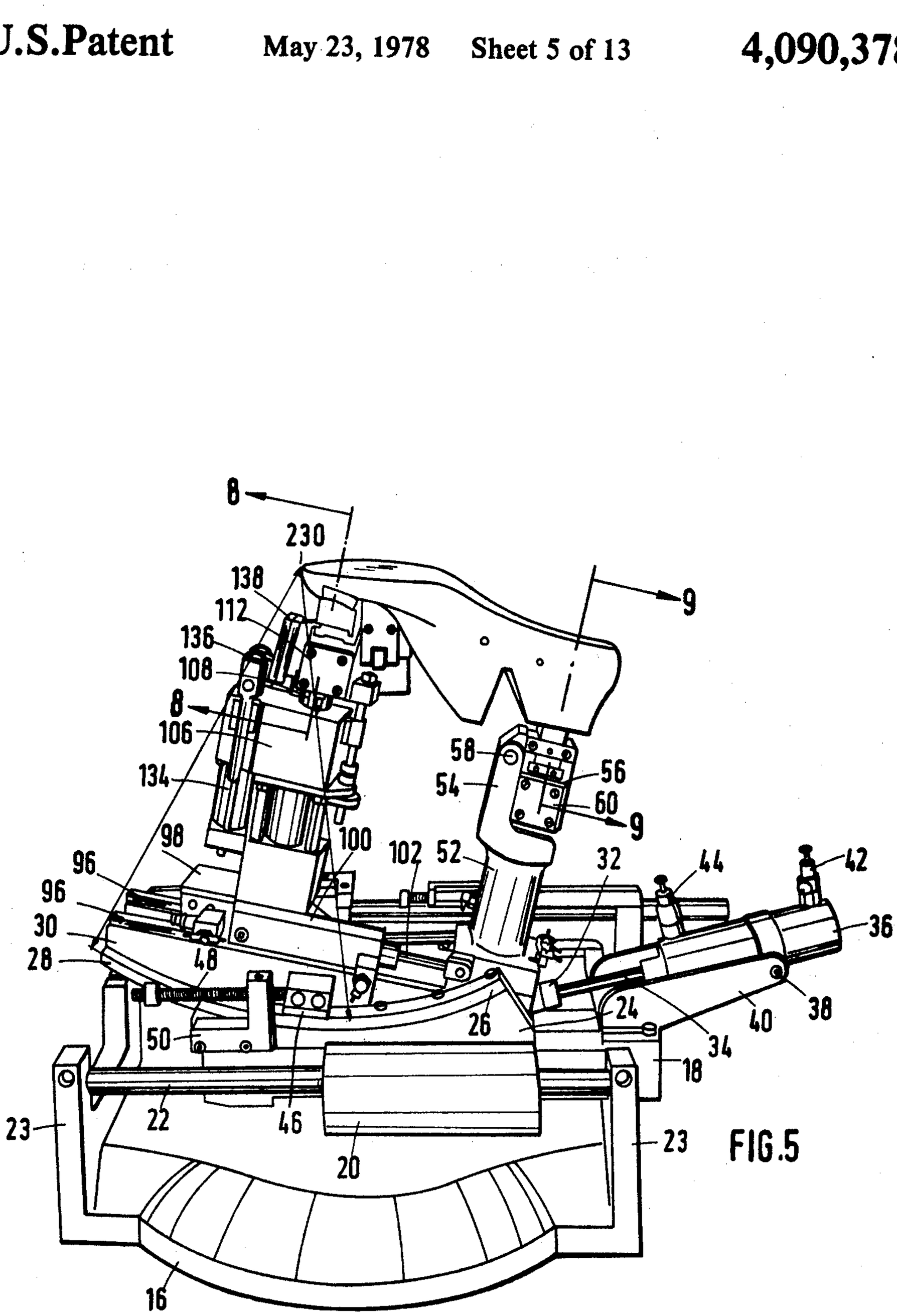
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FIG.5

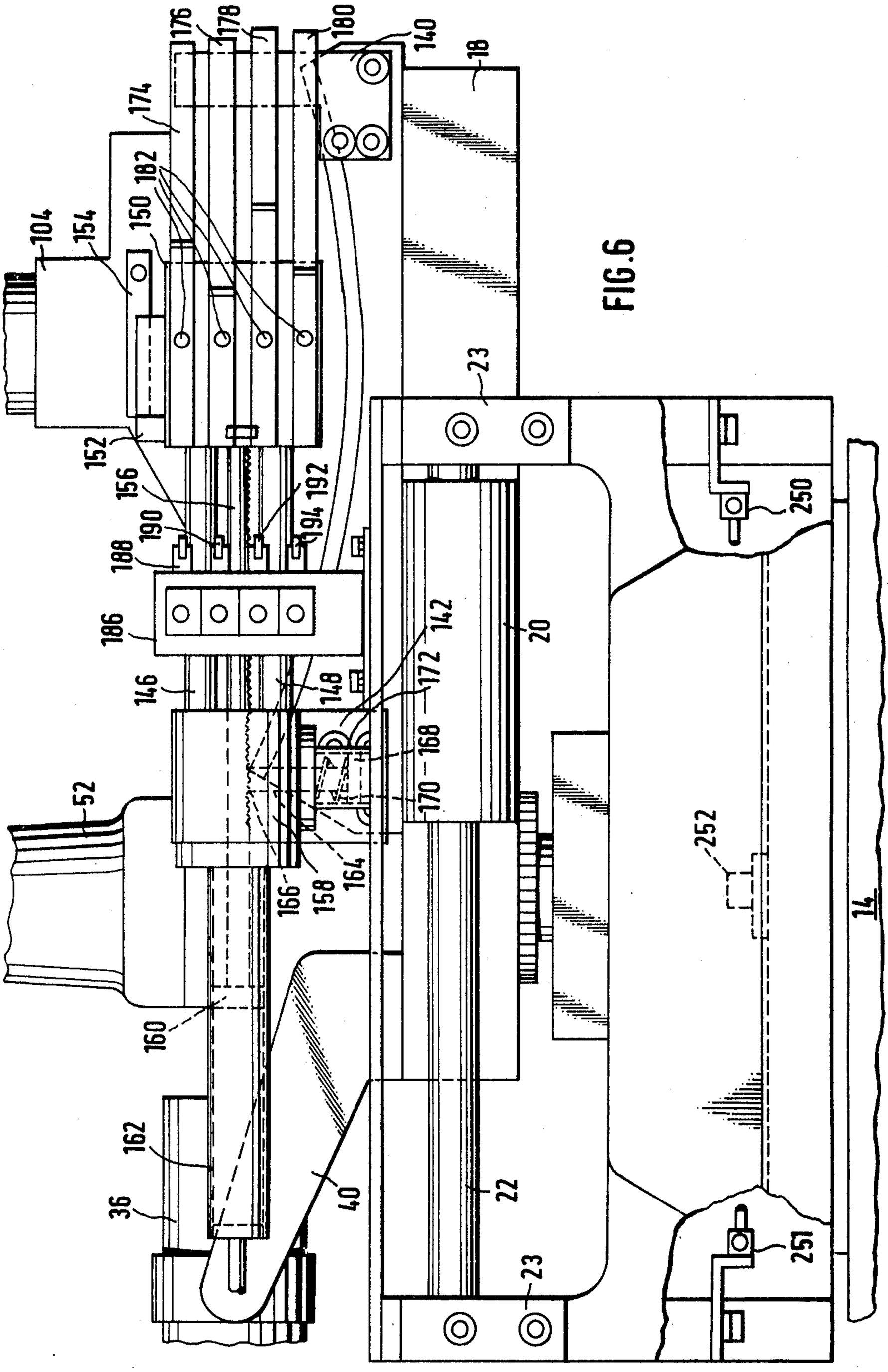
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FIG.6

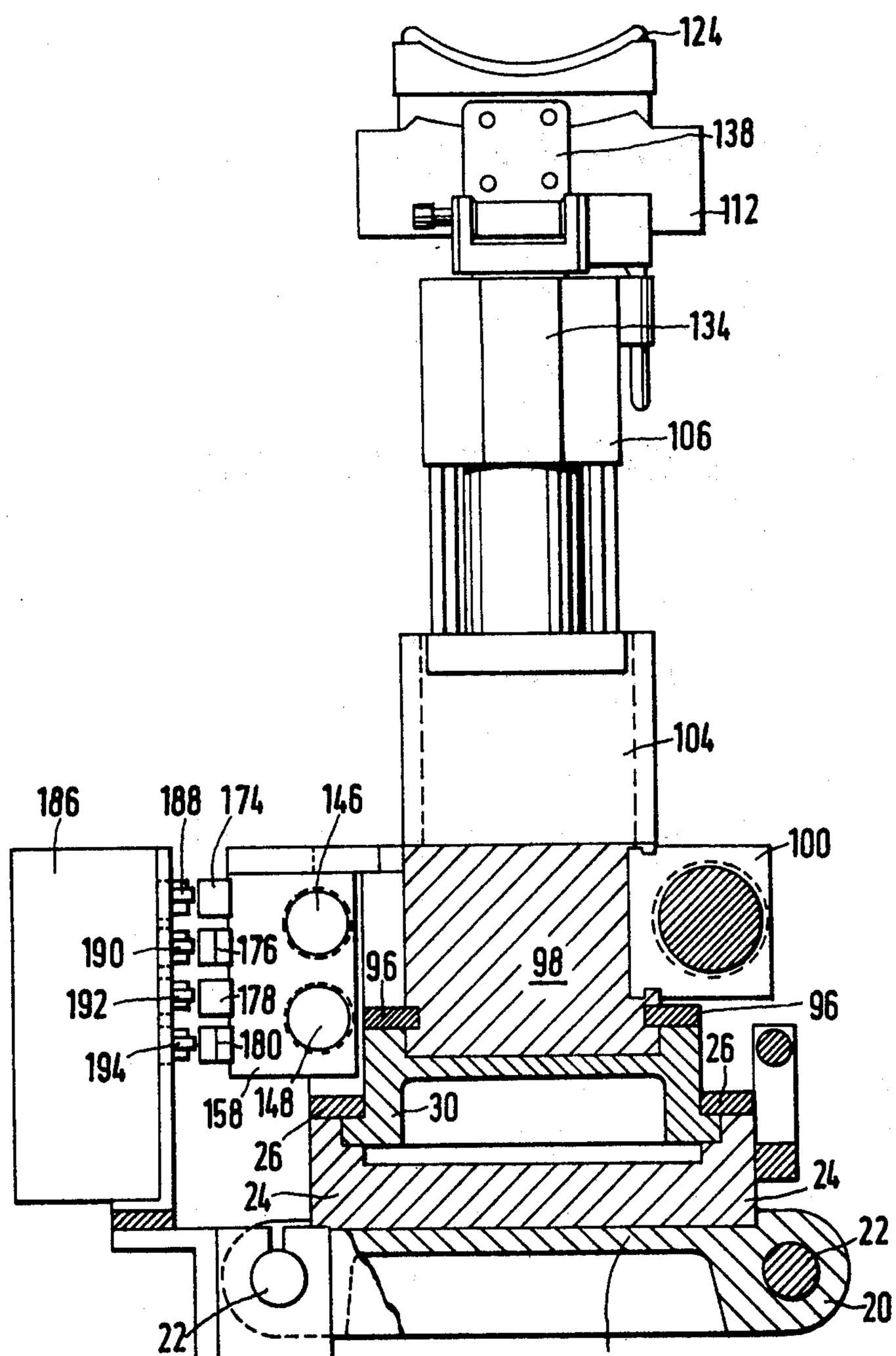
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FIG.7

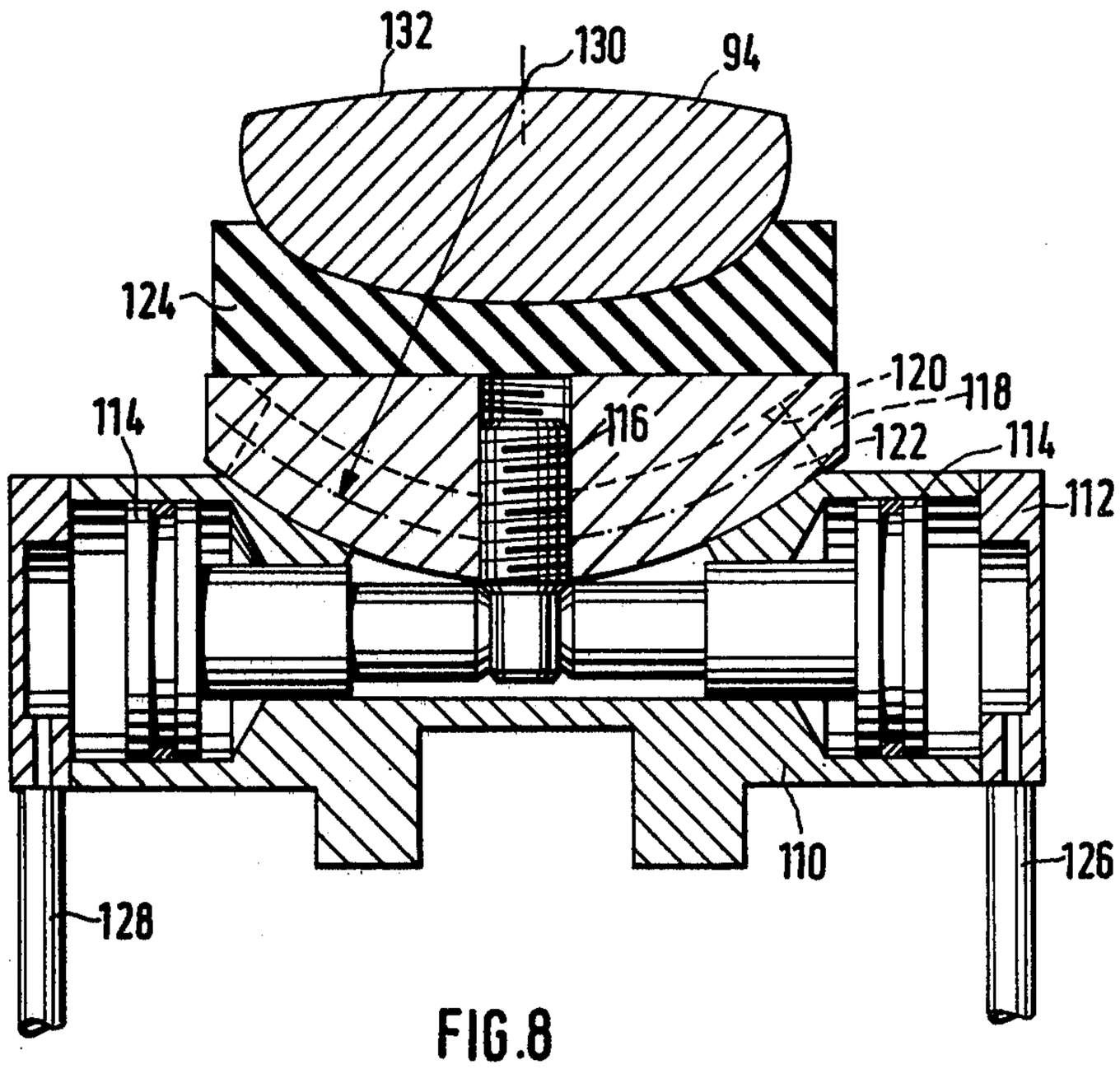


FIG.8

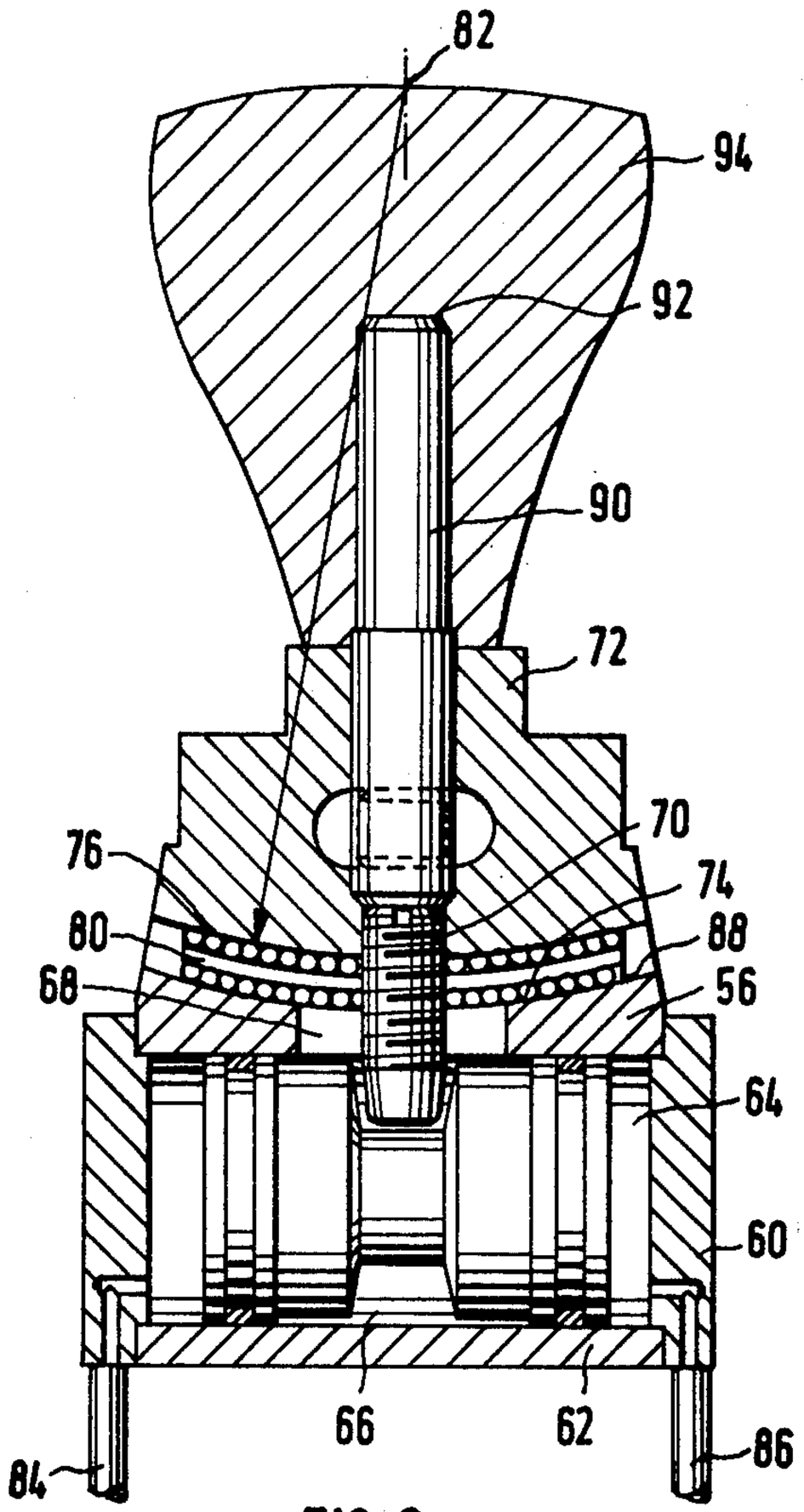


FIG.9

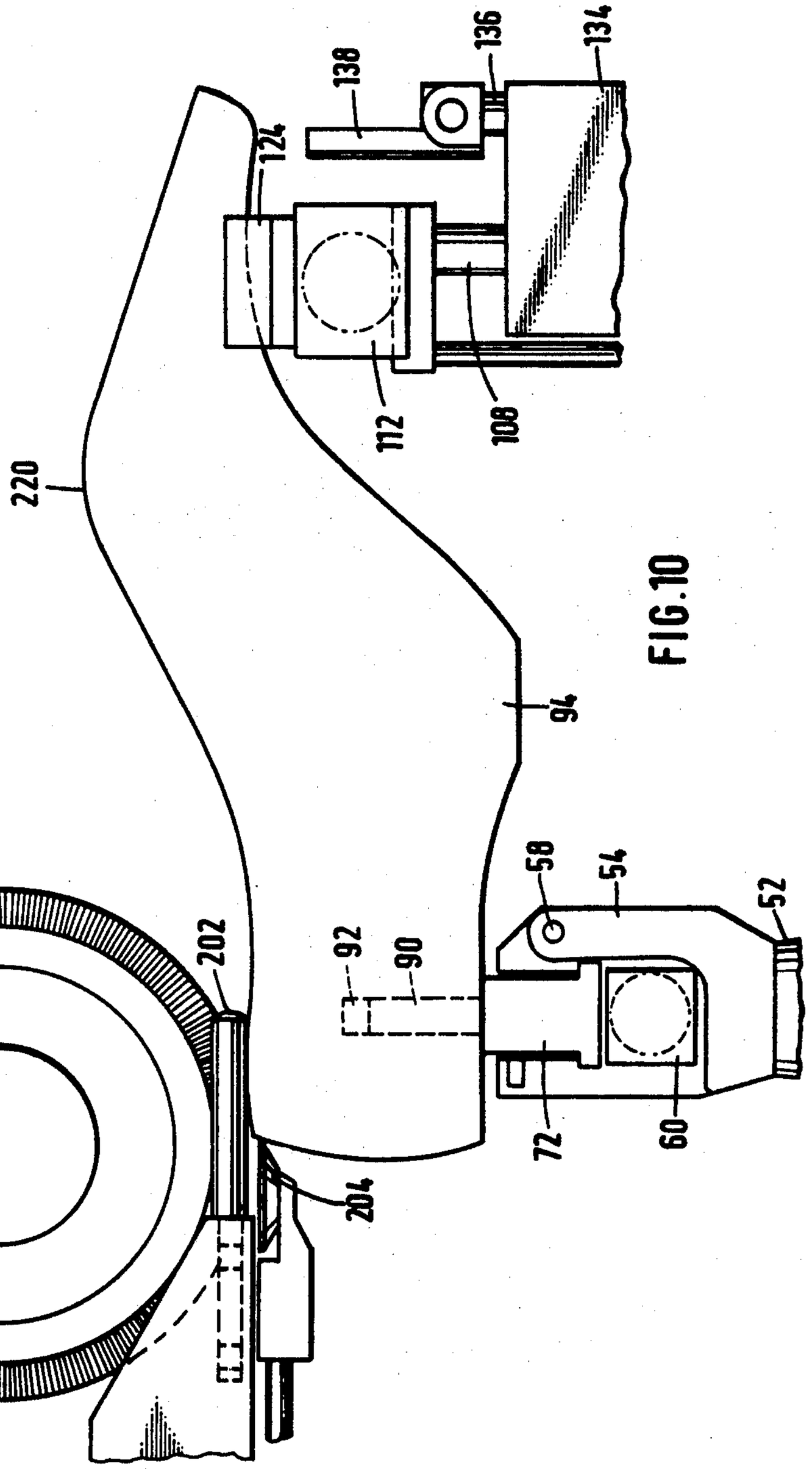


FIG.10

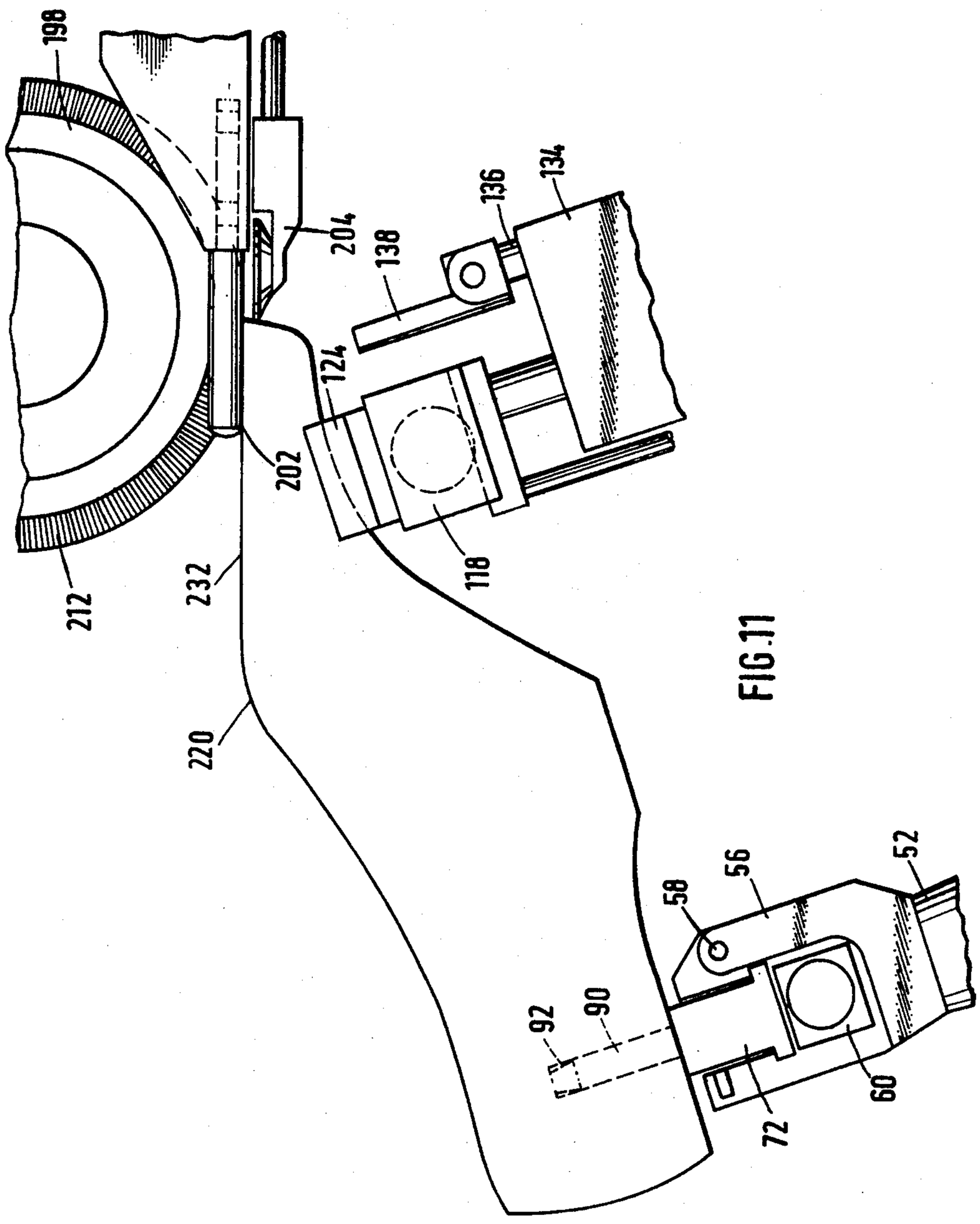
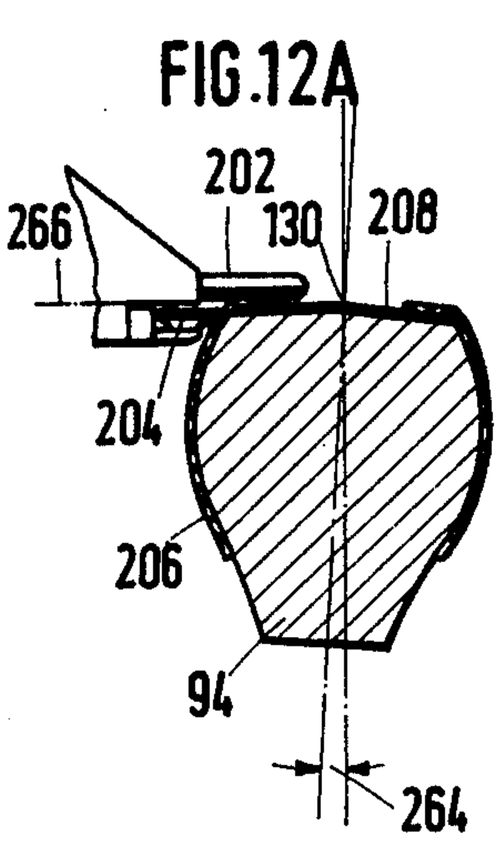


FIG.11

FIG.12A



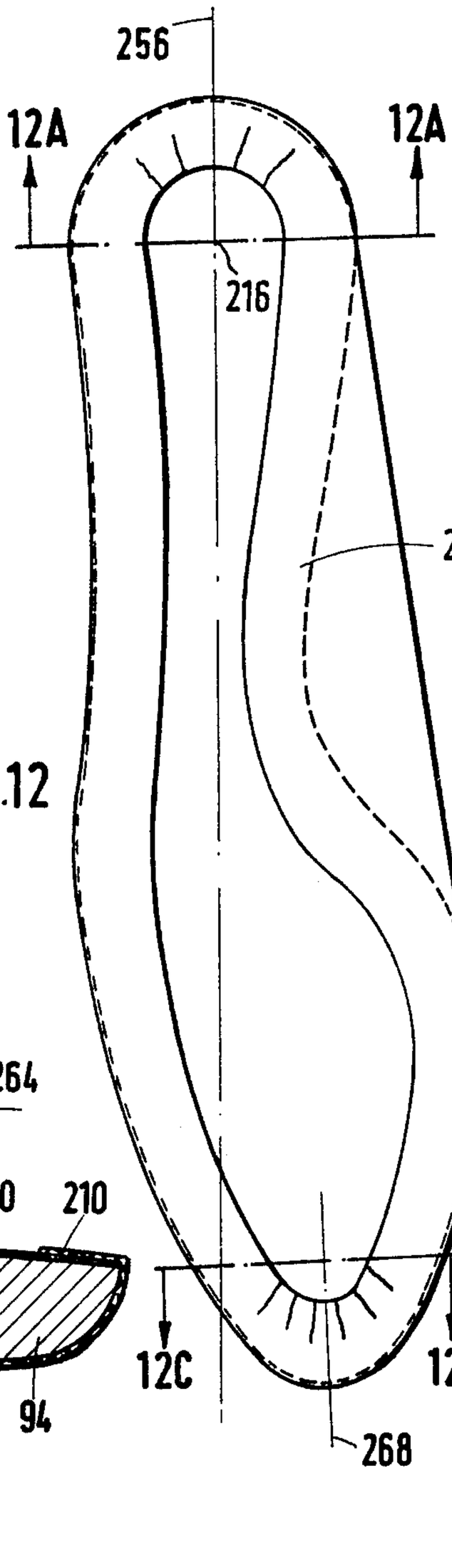


FIG.12

FIG.12B

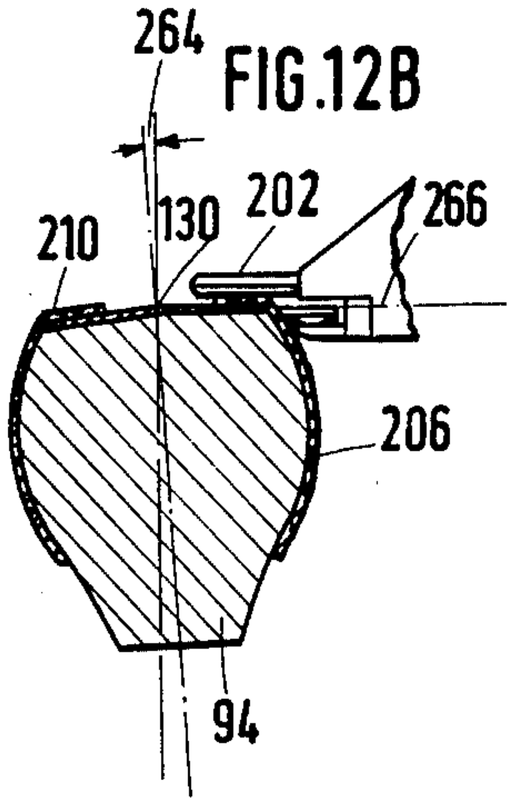


FIG.12C

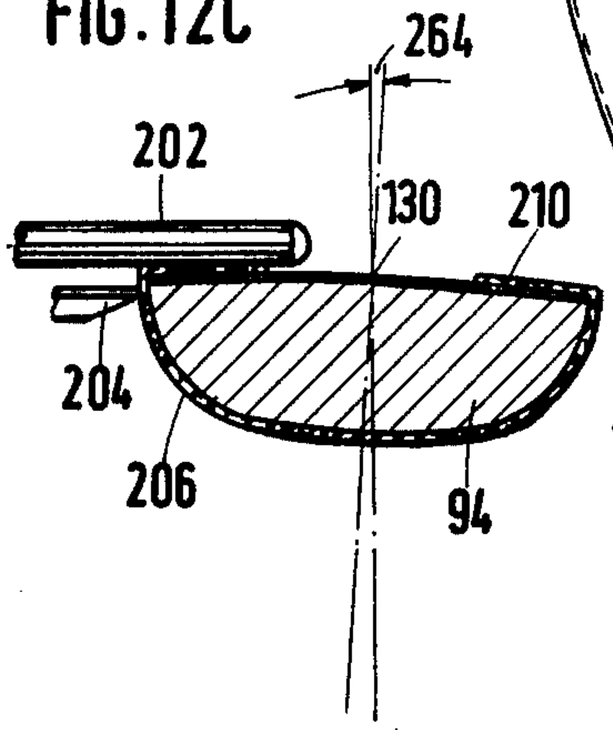
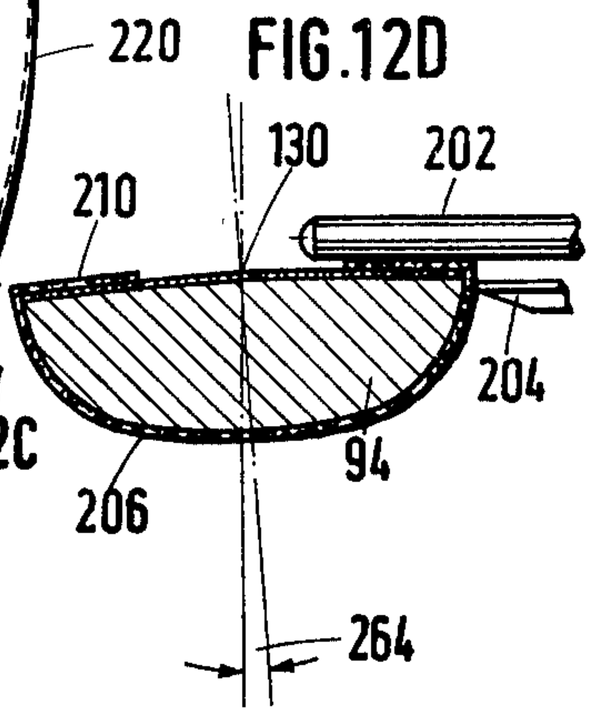


FIG.12D



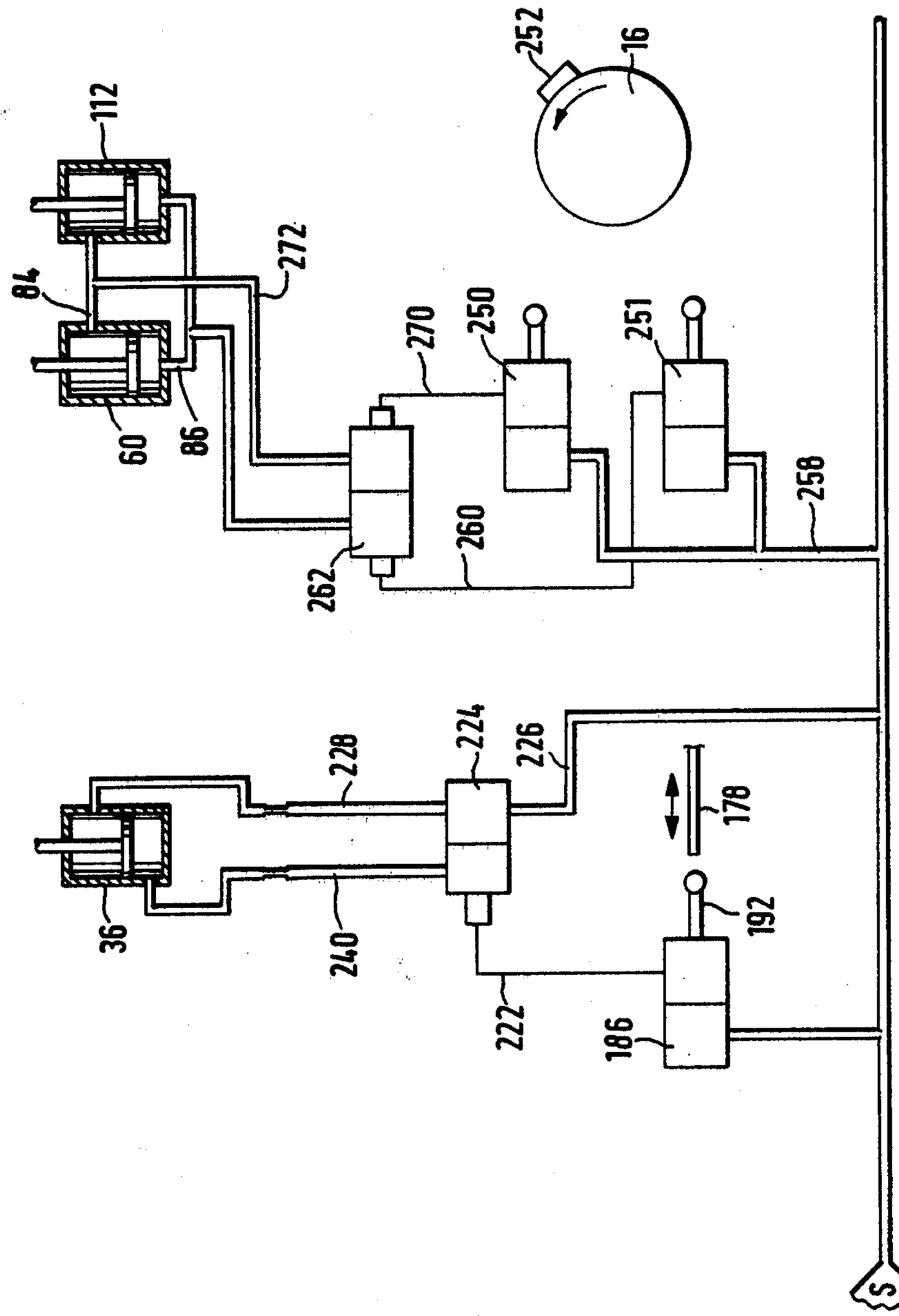

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FIG. 13

ROUGHING MACHINE HAVING ROCKABLE SHOE ASSEMBLY SUPPORT

BACKGROUND AND SUMMARY OF THE INVENTION

U.S. Pat. No. 3,843,985 and U.S. Patent Application Ser. No. 694,005 filed June 8, 1976, now U.S. Pat. No. 4,020,660, each discloses a machine for roughing the margin of an upper of a shoe assembly, the shoe assembly comprising a last having an insole located on its bottom and the upper mounted thereon with the upper margin lying against and being secured to the bottom of the insole. The machine includes: a shoe assembly support for supporting the shoe assembly bottom up; a margin sensor engageable with the upper margin; a side sensor, located below the margin sensor, engageable with the side of the shoe assembly; a roughing tool located inwardly of the side sensor and proximate to the margin sensor and engageable with the upper margin to rough the upper margin; means mounting both sensors and the roughing tool for unitary heightwise movement; and means mounting both sensors and the roughing tool for unitary inward-outward movement (movement towards and away from the shoe assembly) in a particular direction. The machine incorporates means for so moving the support as to move succeeding upper margin portions past the margin sensor and as to move corresponding succeeding side portions of the shoe assembly past the side sensor to thereby move the upper margin portions past the roughing tool. The machine also incorporates means enabling the margin sensor to move heightwise and follow the contour of the upper margin portions to thereby enable the roughing tool to move heightwise accordingly and means enabling the side sensor to move inwardly-outwardly in said particular direction and follow the contour of the shoe assembly side portions to thereby enable the roughing tool to move inwardly-outwardly accordingly.

It is desirable, in order for the roughing tool to engage all portions of the upper margin uniform distances inwardly of the outer peripheries of the margin portions, that a line extending from the area of engagement of the roughing tool with each margin portion along the surface of the margin portion to the outer periphery of the margin portion towards the area of engagement of the side sensor with the corresponding portion of the side of the shoe assembly be substantially parallel to said particular direction of unitary inward-outward movement of the sensors and the roughing tool. If a margin portion is so contoured that this line is sloped downwardly with respect to said particular direction as it extends outwardly from the area of engagement of the roughing tool with the upper margin towards the outer periphery of the margin portion, the roughing tool will, undesirably, engage the margin portion further inwardly of its outer periphery than is the case when said line is parallel to said particular direction.

The principal object of this invention is to provide an improved arrangement for ensuring that each margin portion is so positioned as it passes the sensors and the roughing tool that said line is substantially parallel to said particular direction regardless of any changes in the planes in which succeeding margin portions lie. This object is achieved by providing: means mounting the support for rocking movement between a first position and a second position; and means, effective during the support movement, for rocking the support from its first position to its second position.

Dealing with a first species of the invention, the heel and forepart portions of the shoe assembly bottom lie in intersecting planes. In each of the above referred to prior art machines, the means for so moving the support as to move the margin portions past the roughing tool comprises: means for so rotating the support 180° about a vertical axis in a particular rotational direction as to rotate a first end of the upper margin, disclosed as the heel end, past the roughing tool; means for thereafter so horizontally moving the support linearly as to move a side of the upper margin past the roughing tool; and means for thereafter so rotating the support 180° about said vertical axis in the same rotational direction as to rotate the second end, disclosed as the toe end, of the upper margin past the roughing tool. The particular direction of inward-outward movement of the sensors and the roughing tool is substantially horizontal. The shoe assembly is so supported that the first end of the shoe assembly bottom lies in a substantially horizontal plane during its rotation so that the desired relationship between said line along each margin portion and said particular direction is maintained during this rotation. However, in the prior art machine the shoe assembly is so supported that the second end lies in a plane that is inclined upwardly in a direction extending from the second end (the toe end) towards the first end (the heel end). Therefore, during the rotation of the second end of the shoe assembly the desired relationship between said line and said direction is not maintained in the prior art machine. In order to overcome this deficiency and in accordance with the first species of the invention, the prior art machine is improved by mounting the support for rocking movement about a horizontal axis that is transverse to the direction of linear movement of the support and by rocking the support from its first position to its second position by triggering means actuable pursuant to the linear movement of the support to thereby cause the second end of the shoe assembly bottom to lie in a substantially horizontal plane during the second 180° rotation of the support.

Dealing with a second species of the invention, certain shoe assembly bottoms are arched upwardly convex in planes that are transverse to the longitudinal heel-toe axis of the shoe assembly so that the upper margin tapers downwardly to a great extent towards the side of the shoe assembly, this condition existing particularly in the forepart area of the shoe assembly bottom. In the above referred to prior art machines, the means for so moving the support as to move the upper margin portions past the roughing tool comprises: means for so horizontally moving the support linearly in a first direction as to move a first side of the upper margin past the roughing tool; means for thereafter so rotating the support 180° about a vertical axis as to rotate an end of the upper margin past the roughing tool; and means for thereafter so horizontally moving the support linearly in a second direction opposite to said first direction as to move the second side of the upper margin past the roughing tool. As aforesaid, the direction of inward-outward movement of the sensors and the roughing tool in each prior art machine is substantially horizontal. When the prior art machine operates on a shoe assembly having the upwardly convex sections and the shoe assembly is so supported that said lines along the margin portions on one side of the shoe assembly are substantially parallel to said particular

direction, the lines along the margin portions on the other side of the shoe assembly will not be parallel to said particular direction. In order to overcome this deficiency and in accordance with the second species of the invention, the prior art machine has the improvements wherein: the means mounting the support is so constructed as to enable the support to be rocked through an upwardly concave arc whose center of curvature lies on a horizontal axis that is parallel to the directions of linear movements of the support; the first position of the support is such that the support is tilted about this horizontal axis on one side of the vertical axis of the support; the second position of the support is such that the support is tilted about this horizontal axis on the other side of the vertical axis of the support; and the support is rocked from its first position to its second position by triggering means that are actuable pursuant to the support rotation.

BRIEF DESCRIPTION OF THE DRAWINGS

FIGS. **1** and **2** are side views of the machine taken from opposite sides of the machine;

FIG. **3** is a perspective view of a mount section of the machine showing the shoe assembly mounted thereto;

FIGS. **4** and **5** are views similar to FIG. **3** showing the shoe assembly rocked to its second position in accordance with the first species of the invention taken from opposite sides of the mount section;

FIG. **6** is a side elevation, to an enlarged scale, of a portion of the mount section;

FIG. **7** is a transverse partially cross-sectional view of a portion of the mount section;

FIGS. **8** and **9** are respectively sections taken along the lines **8—8** and **9—9** of FIG. **5**;

FIG. **10** is a representation of the shoe assembly as it is supported in the machine while its upper margin is being roughed;

FIG. **11** is a view similar to FIG. **10** showing the shoe assembly rocked to its second position in accordance with the first species of the invention;

FIG. **12** is a top plan view of the shoe assembly bottom as it appears when mounted bottom-up in the machine;

FIGS. **12A** and **12C** are sections respectively taken along the lines **12A—12A** and **12C—12C** of FIG. **12** showing the shoe assembly support in its first position in accordance with the second species of the invention and showing the margin sensor and the height sensor in engagement with the shoe assembly;

FIGS. **12B** and **12D** are sections respectively similar to FIGS. **12A** and **12C** showing the shoe assembly as it appears when the shoe assembly support has been rocked to its second position in accordance with the second species of the invention; and

FIG. **13** is a schematic representation of part of the machine control circuit.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The operator is intended to stand to the left of the machine as seen in FIG. **1** and to the right of the machine as seen in FIG. **2**. Directions extending toward the operator will be designated as "forward" and directions extending away from the operator will be designated as "rearward". The front of the machine is closest to the operator and the back of the machine is furthermost from the operator.

The machine, as shown in FIGS. **1** and **2**, includes a shoe assembly mount section **10** and a tool section **12** located rearwardly of the section **10**.

The shoe assembly mount section **10** includes a stationary base **14** having a turntable **16** mounted thereto for rotation in a horizontal plane about a fixed vertical axis. A slide **18** (FIGS. **1–5**) is slidably guided in the turntable **16** for reciprocal motion in a horizontal plane between two end positions on the turntable by means of two bushings **20** on the slide **18** that are slidably guided on rods **22**. The rods **22** extend across the top of the turntable **16** and are affixed to the turntable **16** by means of holders **23** supporting the ends of the rods **22**.

Two spaced parallel guide elements **24** are fastened to the slide **18**. Each guide element **24** mounts an arcuate track **26** which forms a segment of a circle. A base **30** is slidably guided by means of arcuate guides **28** attached thereto in the arcuate tracks **26**. Two spaced support components **40**, screwed onto the slide **18**, have pins **38** thereon which pivotally mount a double-acting pneumatic motor **36** for swinging movement about a transverse axis. The piston rod **34** of the motor **36** is connected by means of a bracket **32** to the base **30**. The motor **36** may be operated by means of compressed air passing thereto through ports **42, 44** to move the base **30** to and fro in the arcuate tracks **26** to thereby impart a swinging movement to the base **30** and the parts carried thereby. A stop **46** screwed onto the base **30** coacts with a threaded spindle **48** which is screwed into an angle plate **50** fastened to the slide **18** to limit the displacement of the movement of the base **30** in the tracks **26**.

A post **52** is fastened to the base **30** and extends upwardly thereof. An upwardly extending bracket **54** is carried on the upper end of the post **52** and a base **56** (FIGS. **5** and **9**) is swingably mounted, by means of a pivot pin **58**, to the bracket **54**. The base **56** mounts a double-acting pneumatic motor **60** on its bottom. A limit-stop arrangement limits the extent of clockwise movement, as seen in FIG. **5**, of the base **56**, together with the motor **60**, about the pivot pin **58** while permitting free counterclockwise movement of the base **56** and the motor **60** from the FIG. **5** position. The motor **60** comprises a double flanged piston **64** that is slidably guided in a cylinder **62**. The piston **64** has an annular groove **66** in its middle. An actuating pin **70**, which is captured in a bore of a bearing element **72**, projects into and projects upwardly of the groove **66**. The base **56** is so shaped as to have a circularly curved guide surface **74** which corresponds to a similarly curved guide surface **76** of the bearing element **72**. A needle bearing **80** is so arranged between the two guide surfaces **74** and **76** that the bearing element **72** can be swung transversely about the longitudinal axis designated by number **82** in FIG. **9**. This swinging movement is produced by the motor **60** whose piston **64** can be supplied with pressurized air via ports **84** and **86**. The bearing element **72** is laterally guided alongside the piston **64** on the base **56** by means of guide rails **88** that are appropriately bent in the form of a circular arc.

The bearing element **72** carries a last pin **90** that is arranged coaxially to and projects upwardly of the actuating pin **70**, the last pin **90** fitting into a corresponding last pin hole **92** of a last **94** mounted on the bearing element **72** whereby the bearing element **72** and the last pin **90** form a supporting element for the last **94**. The last **94** forms a part of a shoe assembly described below.

Rails **96** on the base **30** slidably mount a bar **98** to the top of the base **30** for movement towards and away from the post **52**. A pneumatic motor **100** is attached to the bar **98** and the piston rod **102** of the motor **100** has its end attached to the post **52**, the motor **100** thus enabling the bar **98** to be moved towards and away from the post **52**.

The bar **98** carries a foot **104** which mounts a pneumatic motor **106**. The upwardly projecting piston rod **108** of the motor **106** is connected with the cylinder **110** of a double-acting pneumatic motor **112**.

As can be seen in FIGS. **5** and **8**, two pistons **114** are slidably mounted in the cylinder **110** of the motor **112**. The pistons **114** are engageable with the opposite sides of an actuating trunnion **116** which projects through a slot of the wall of the cylinder **110**. The actuating trunnion **116** is rigidly connected with a circular segment **118**. The circular segment **118** is slidably guided, via a T-shaped groove **120**, in a correspondingly shaped guided element **122** which is affixed to the cylinder **110**. The circular segment **118** has a level top on which is mounted a rubber supporting toe pad **124** which supports the forepart of the shoe assembly comprised of the last **94** in the manner shown in FIG. **8**.

When the two pistons **114** of the motor **112** are alternately supplied with pressurized air via the ports **126** and **128** leading into them, the actuating trunnion **116** is moved to and fro. This results in the circular segment **118** being swung in the guideway formed by the groove **120** about an axis designated by number **130** so that the shoe assembly is laterally tilted or rocked about this axis which lies in the area of the bottom **132** of the shoe assembly.

A pneumatic motor **134** is mounted on the front of the foot **104**. The upwardly directed piston rod **136** of the motor **134** is connected to a toe stop **138** which, when the motor **134** is actuated, is raised to such an extent as to be in registry with the toe end extremity of the shoe assembly.

Two mounts **140, 142** (FIGS. **3** and **6**) are affixed to the slide **18** by being screwed onto one of the guide elements **24**, the mounts **140, 142** being located laterally of the base **30**. The ends of two spaced and parallel guide rods **146** and **148** that are located one above the other and are arranged parallel to the direction of movement of the slide **18** on the turntable **16** are inserted into and extend between the mounts **140, 142**. A plate-like guide element **150** is slidably guided longitudinally along the guide rods **146, 148**. The guide element **150** has a projecting nose **152** on its top that is in intersecting relationship with a laterally projecting follower **154** that is screwed onto the foot **104**. The nose **152** and the follower **154** are so arranged that the follower **154** can engage and push the nose **152** during movement of the foot **104** towards the post **52** and the nose **152** can engage and push the follower **154** during movement of the guide element **150** away from the post **52**. An end of a toothed guide bar **156** is rigidly connected to the guide element **150** and extends parallel to the guide rods **146** and **148**, the guide bar **156** being longitudinally guided and slidable in a housing **158** that is screwed to the slide **18**. The end of the guide bar **156** remote from the guide element **150** is coupled to the piston **160** of a pneumatic motor **162**, the motor **162** being mounted on the housing **158**. A locking trunnion **164** is longitudinally guided in the housing **158** in a direction that is crosswise to the longitudinal axis of the guide bar **156**. The trunnion **164** has teeth **166** at its top that correspond to the teeth on the guide bar **156** and is connected at its bottom to the piston of a pneumatic motor **172**, said piston being yieldably urged downward by a return spring **170**. When the motor **172** is actuated, the teeth **166** of the locking trunnion **164** are caused to mesh with the teeth of the guide bar **156** so that the guide bar **156** is locked in relation to the housing **158**, this resulting in the guide element **150** also being locked with respect to the slide **18** in the position determined by the position of meshing of the teeth **166** with the teeth on the guide bar **156**.

Four cams **174, 176, 178, 180**, which act as actuating members, are spacedly locked to the guide element **150** in desired positions by adjusting screws **182** shown in FIG. **6**.

A holder **184** screwed to the turntable **16** mounts a valve assembly **186**. The valve assembly **186** is located laterally of the path of movement of the guide element **150**. The valve assembly **186** comprises four valves, which act as control members, having valve actuating members **188, 190, 192** and **194**. The valve actuating members **188, 190, 192** and **194** are respectively in alignment with the cams **174, 176, 178** and **180**.

The tool section **12** of the machine includes a rotating wire brush **198** (FIGS. **2** and **10**) which forms a roughing tool. The brush **198** is mounted for heightwise movement about the horizontal axis of two bearing trunnions **200**. A pair of fork tines **202** are mounted on opposite sides of the brush **198** and a feeler roll **204** is located below the fork tines **202**. The fork tines **202** act as a margin sensor and the feeler roll **204** acts as a shoe assembly side sensor.

In the idle condition of the machine: the slide **18** is at one of its end positions on the turntable **16**; the piston rod **34** is retracted into the motor **36** to thereby so position the base **30** in the tracks **26** that, as shown in FIG. **3**, the base **30** is in a prone position; the piston rod **102** is projected out of the motor **100** to place the foot **104** and the parts carried thereby, including the toe pad **124** and the toe stop **138**, relatively remote from the post **52** and the last pin **90**; the last pin **90** is in substantial alignment with the axis of rotation of the turntable **16** and is in substantial forward-rearward alignment with the brush **198**; the brush **198**, the margin sensor **202**, and the side sensor **204** are swung upwardly about the axis of the trunnions **200**; the piston rod **108** is retracted into the motor **106** to place the toe pad **124** in a lower position; the piston rod **136** is projected out of the motor **134** to place the toe stop **138** in its raised position; the piston **160** is projected out of the motor **162** by pressurized air to thereby yieldably urge the guide bar **156** and the guide element **150** rightwardly (FIG. **6**) to a position wherein the nose **152** engages the follower **154**; there is no pressurized air in the motor **172** so that the spring **170** is urging the trunnion **164** downwardly with the teeth **166** disengaged from the teeth of the guide bar **156**; and the cams **174, 176, 178** and **180** are respectively spaced from and disengaged from the valve actuating members **188, 190, 192** and **194**.

FIGS. **12** and **12A–12D** show the shoe assembly that comprises the last **94** having an upper **206** mounted thereon and an insole **208** located on its bottom. The upper **206** has been lasted so that the upper margin **210** lies against and is secured to the insole **208** and extends inwardly of the periphery of the insole and the last bottom.

The shoe assembly is mounted by the operator bottom-up on the last pin **90** with the last pin entering the last pin hole **92** in such a manner that the toe end of the

shoe assembly faces the foot **104** with the heel portion of the shoe assembly bottom lying in a substantially horizontal plane. The operator, in the manner disclosed in U.S. Patent Application Ser. No. 694,005, now actuates the motor **100** so as to retract its piston rod **102** and thus move the foot **104** together with the toe pad **124** and the toe stop **138** towards the post **52** under the yieldable force of pressurized air until the toe stop **138** engages the toe end of the shoe assembly. Concurrently with this actuation of the motor **100**, the pressurized air is vented from the motor **162**. The movement of the foot **104** towards the post **52** causes the follower **154** to push the nose **152** towards the post **52** and thereby move the guide element **150**, the cams **174, 176, 178** and **180**, and the guide bar **156** leftwardly (FIG. **6**) against the force of the pressurized air of the motor **162**. When the toe stop **138** has engaged the toe end of the shoe assembly, the motor **172** is actuated to raise the trunnion **164** and thus cause the teeth **166** to mesh with the teeth on the guide bar **156** so as to lock the foot **104** in the position it had assumed on the base **30** when the toe stop **138** engaged the toe end of the shoe assembly. This is followed by an actuation of the motor **106** to raise the toe pad **124** into engagement with the vamp of the shoe assembly and thereby swing the base **56** clockwise (FIG. **5**) about the pivot pin **58** to the extent permitted by the aforementioned limit-stop arrangement so as to lock the shoe assembly to the post **52** and the foot **104** of the slide **18** for the below described roughing operation and an actuation of the motor **134** to lower the toe stop **138** out of engagement with the shoe assembly so that it will not interfere with the roughing operation.

In the manner disclosed in U.S. PAT. No. 3,975,932, after the shoe assembly has been locked to the slide **18**, the margin sensor **202**, the roughing tool **198** and the side sensor **204** are lowered about the axis of the trunnions **200** until the margin sensor **202** engages the upper margin **210** in one of the breast line regions (FIG. **12A**), the shoe assembly being so located that the margin sensor **202** will intersect its bottom during its descent and the side sensor **206** will be located outwardly of the shoe assembly when the margin sensor engages the shoe assembly.

As explained in greater detail in U.S. PAT. No. 3,975,932, in response to the engagement of the margin sensor **202** with the upper margin **210**, the side sensor **204** is moved forwardly into engagement with the side of the shoe assembly after which the roughing tool **198** is swung downwardly until radially projecting bristles **212** on the roughing brush **198** engage the upper margin **210** between the fork tines of the upper sensor **202**, as indicated in FIG. **10**.

Now, by means of the mechanism disclosed in U.S. Patent Application Ser. No. 694,005, the turntable **16** is unlocked and is rotated 180° about its axis of rotation about a center that is substantially in alignment with the last pin **90** and that lies approximately at the center of curvature, indicated by number **216** in FIG. **12**, of the heel portion of the shoe assembly. During this 180° rotational movement of the turntable **16**, the heel portion of the upper margin **210** is moved past the rotating brush **198** and the brush bristles **212** abrade or rough the upper margin.

At this time, as described in U.S. Pat. No. 3,843,985 and in U.S. Patent Application Ser. No. 694,005, the brush **198**, the margin sensor **202** and the side sensor **204** are mounted for unitary, substantially vertical heightwise movement and substantially horizontal inward-outward movement and for tilting movement about the inward-outward axis of the margin sensor **202**. During the movement of the heel portion of the upper margin **210** past the rotating brush **198**, as well as the movements of the other portions of the upper margin past the rotating brush as described below, the brush must move upwardly and downwardly in accordance with the elevation of the portion of the upper margin being roughed and must move forwardly and rearwardly so as to be positioned the desired distance inwardly of the outer periphery of the upper margin being roughed. In addition, the central plane of the brush **198**, shown by number **372** in U.S. Pat. No. 3,843,985, should be tilted during the movement of the portions of the upper margin being roughed past the brush **198** so as to be at right angles to the plane of the portion of the upper margin **210** being roughed. The upward-downward movements are accomplished pursuant to upward-downward movements of the margin sensor **202** as the upper margin **210** moves past the margin sensor, these upward-downward movements being substantially vertical. The forward-rearward movements are accomplished pursuant to inward-outward movements of the side sensor **204** as the side of the shoe assembly moves past the side sensor, these inward-outward movements being substantially horizontal. The tilting movements are accomplished pursuant to tilting of the margin sensor **202** as the upper margin moves past the margin sensor **202**. The means for accomplishing all these movements are disclosed in U.S. Pat. No. 3,843,985 and in U.S. Patent Application Ser. No. 694,005.

After the turntable **16** has rotated 180° to enable the heel portion of the upper margin **210** from one breast line portion to the other breast line portion to be roughed by the brush **198**, the turntable **16**, by mechanism shown in U.S. Patent Application Ser. No. 694,005, is caused to cease its rotation and to be locked against rotation. This is followed by a first linear horizontal movement of the slide **18** with respect to the stationary turntable **16** so that the brush **198** engages a first side portion of the upper margin **210** as the shoe assembly moves in a heel-to-toe direction past the brush **210** to thereby enable the brush to rough the first side portion of the upper margin.

When the brush **198**, during the linear heel-to-toe movement of the shoe assembly past the brush, reaches the vicinity of the ball break area **220** (FIG. **10**) of said first side portion of the upper margin **210**, the actuating cam **178**, which moves linearly with the slide **18**, moves past and shifts the valve actuating member **192**. Referring to FIG. **13**, the shifting of the valve actuating member **192** enables pressurized air to pass from a source S through the valve assembly **186** and a pilot line **222** to a valve **224** to shift the valve **224**. The motor **36** is retained in its idle condition by pressurized air passing from the source S through a line **226**, the valve **224**, and a line **228** to the rod end of the motor **36**. The shifting of the valve **224** enables pressurized air to pass from the valve **224** through a line **240** to the head end of the motor **36** to thereby cause the motor **36** to project its piston rod **34** to thereby shift the base **30** arcuately from its prone position to an inclined position along the tracks **26** about the horizontal axis **230** of the center of curvature of the tracks **26** which lies in the vicinity of the toe end of the shoe assembly and which extends transversely to the heel-toe lengthwise dimension of the shoe assembly. This shifting of the base **30** causes the shoe assembly bottom to rock downwardly about the

axis **230** to the FIG. **11** position wherein the forepart portion **232** of the shoe assembly bottom substantially lies in a horizontal plane. The continued heel-to-toe linear movement of the shoe assembly causes the forepart portion of the first side portion of the upper margin **210** to move past and be roughed by the brush **198** while the forepart portion **232** substantially lies in a horizontal plane until the center of curvature of the toe portion of the shoe assembly bottom is in approximate registry with the axis of rotation of the turntable **16** at which time the cam **174** engages and shifts the valve actuator **188**. The shifting of the valve actuator **188**, by means shown in U.S. Patent Application Ser. No. 694,005, causes the turntable **16** to be unlocked for rotation, while the slide **18** is stationary, and cause a second 180° rotation to be imparted to the turntable in the same direction as the first 180° rotation so that the toe portion of the upper margin **210** is swung past the brush **198** and is roughed.

After completion of the second 180° rotation of the turntable **16**, the turntable is caused to cease its rotation and to be locked against rotation by mechanism shown in U.S. Patent Application Ser. No. 694,005. This is followed by a second linear horizontal movement of the slide **18** with respect to the stationary turntable in a direction that is opposite to the first linear movement to bring the slide **18** back to its idle end position in the turntable **16**. Pursuant to the second linear movement of the slide **18**, the shoe assembly moves past the brush **198** so that the brush engages the second side portion of the upper margin **210** as the shoe assembly moves in a toe-to-heel direction past the brush **198** and the brush **198** thus roughs the second side portion of the upper margin **210**.

During the second linear movement of the slide **18**, at about the time that the ball break area **220** on the second side portion of the upper margin **210** passes the brush **198**, the actuating cam **178** becomes disengaged from the valve actuating member **192** to thereby enable the valve **186** to return to its idle condition and cut off the pressurized air flowing to the valve **224** through the pilot line **222**. The valve **224** therefore shifts back to its idle condition to enable pressurized air to again flow to the rod end of the motor **36** through the line **228** to cause the motor **36** to retract its piston rod **34** to thereby swing the base **30** along the tracks **26** and return the base **30** to its original prone position. As a result, by the time the heel portion of the upper margin **210** is engaged by the brush **198** during the second linear movement of the slide **18**, said heel portion again lies in a substantially horizontal plane.

Upon termination of the second linear movement of the slide **18**, the breast line portion of the upper margin **210** originally engaged by the brush **198** is again in engagement with the brush so that the roughing of the entire upper margin is completed, the machine parts are returned to their idle positions, and the machine cycle is completed. The shoe assembly, with the roughed upper margin, is now removed from the machine.

As indicated in FIGS. **12A–12D**, ideally a line extending from the area of engagement of the brush **198** with a portion of the upper margin **210** along the surface of the margin portion to the outer periphery of the margin portion and towards the area of engagement of the side sensor **204** with the corresponding portion of the side of the shoe assembly should be horizontal and substantially parallel to the horizontal direction of unitary inward-outward movement of the brush **198**, the margin sensor **202**, and the side sensor **204**. With this ideal arrangement, the roughing brush **198** roughs all the portions of the upper margin **210** a desired distance inwardly of the outer periphery of the upper margin. Should this line be inclined downwardly as it extends outwardly of the shoe assembly, the brush **198** will engage the upper margin further inwardly of its outer periphery than the desired distance. When the base **30** is retained in its prone position with the heel portion of the shoe bottom lying in a substantially horizontal plane, the forepart portion of the shoe assembly bottom lies in a plane that inclines upwardly in a direction extending from the toe end extremity of the shoe assembly bottom towards the heel end of the shoe assembly bottom. Therefore, with the forepart portion of the shoe assembly bottom lying in this inclined plane, the roughing brush **198** would engage the margin **210** a distance inwardly of its periphery greater than the desired distance when the toe portion of the upper margin is rotated 180° past the brush **198**. It is for the purpose of preventing this undesired angularity between the direction of inward-outward movement of the side sensor **204** and the above referred to lines along the surface of the toe portion of the upper margin that the base **30** is in its inclined position with the forepart portion of the upper margin lying in a horizontal plane during the swinging of the toe portion of the upper margin past the margin sensor **202**. Since the shoe assembly is in its prone position with the heel portion of the upper margin lying in a horizontal plane when the heel portion of the upper margin **210** is swung past the margin sensor **202**, the direction of inward-outward movement of the side sensor **204** does not have the undesired angularity with respect to the above referred to lines of the heel portion of the upper margin during the 180° swinging of the heel portion of the upper margin past the margin sensor **202**.

At the beginning of the machine cycle during the mounting of the shoe assembly on the machine, the length of the shoe assembly is determined by the motor **100** having the toe stop **138** into engagement with the toe end of the shoe assembly and this, by the mechanism shown in U.S. Patent Application Ser. No. 694,005, determines the extent of the first and second linear movements of the slide **18** thus ensuring that, regardless of the length of the shoe assembly, the entire upper margin **210** can be so moved past the brush **198** as to enable the desired roughing operation to be performed. The position of engagement of the toe stop **138** with the toe end of the shoe assembly also determines the positions of the actuating cams **174, 176, 178** and **180** thus ensuring that they respectively engage the valve actuating members **188, 190, 192** and **194** at the proper time regardless of the length of the shoe assembly. As stated above, the motor **172** acts to lock the foot **104** in the position it had assumed on the slide **18** pursuant to the engagement of the toe stop **138** with the toe end of the shoe assembly that had been caused by the actuation of the motor **100**. During the swinging of the base **30** from its prone position to its inclined position, the follower **154** moves away from the nose **152** and the follower **154** returns into engagement with the nose **152** pursuant to the return of the base **30** from its inclined position to its prone position.

The actuating cams **176** and **180** located on the guide element **150** respectively coact with the valve actuating members **190** and **194** during the linear movements of the slide **18** to control the spacing of the brush **198** with

respect to the peripheries of the concave side portions of the shoe assembly bottom to provide the functions described in U.S. Pat. No. 3,975,932.

In shoe assemblies wherein the bottom is arched and upwardly convex in planes that are transverse to the longitudinal heel-toe axis of the shoe assembly, the upper margin tapers downwardly to a great extent towards the side of the shoe assembly, particularly in the forepart area. As stated above, for the proper positioning of the roughing brush **198** on the upper margin, the lines extending from the area of engagement of the roughing brush **198** with each margin portion along the margin portion surface to the outer periphery of the margin portion and towards the area of engagement of the side sensor **204** with the corresponding portion of the side of the shoe assembly should be substantially parallel to the direction of unitary inward-outward movement of the side sensor **204** and the brush **198**.

In addition, the side sensor **204** should bear against the side of the shoe assembly close to the shoe assembly bottom for the proper positioning of the brush **198** on the upper margin portions being roughed. In order to achieve these results, the shoe assembly is rocked laterally about its longitudinal axis (FIG. **8**) in such directions as to place the upper margin portions being roughed in substantially horizontal planes as they are roughed by the brush **198**.

In order to achieve this rocking of the shoe assembly, two control valves **250** and **251** are mounted to the base **14** and are placed outwardly of the turntable **16** on opposite sides of the turntable as seen in FIG. **6**. The valves **250** and **251** are so arranged as to coact with a cam **252** that projects outwardly of the turntable **16** when the turntable is rotated.

The arrangement is such that, when the above-described rotational movement of the turntable occurs in order to rough the heel portion of the upper margin, the cam **252** engages and momentarily shifts the valve **251** when the brush **198** lies approximately at the longitudinal center line, indicated by number **256** in FIG. **12**, of the heel portion of the shoe assembly. This momentary shifting of the a line valve **251** enables a pulse of pressurized air to pass from the source S through **258**, the valve **251** and a pilot line **260** to the left side (FIG. **13**) of a valve **262** to shift this valve. The shifting of the valve **262** enables pressurized air to pass therefrom to the motors **60** and **112** in such a manner as to respectively cause these motors to simultaneously tilt the last pin **90** and the toe rest **124** in the same direction to thereby tilt the shoe assembly about an angle **264**, as seen in FIGS. **12B** and **12D**, so as to bring the portion of the upper margin being roughed into a substantially horizontal plane.

This laterally tilted position of the shoe assembly is maintained through the first heel-toe linear movement of the shoe assembly and the first part of the subsequent 180° rotation of the turntable until the roughing brush **198** reaches the area of the vertical plane passing through the center of curvature of the toe of the shoe assembly which is indicated in FIG. **12** by number **268** at which time the cam **252** engages and momentarily shifts the valve **250** to thereby send a pulse of pressurized air from the valve **250** through a pilot line **270** to the right side (FIG. **13**) of the valve **262** to thereby shift this valve in the reverse direction from which it had previously been shifted by the pulse of pressurized air in the pilot line **260**. This second shifting of the valve **262** enables pressurized air to pass therefrom through a line **272** to the motors **60** and **112** in such a manner as to cause them to tilt the shoe assembly about the same angle **264** from the vertical in the opposite direction from the vertical, as seen in FIGS. **12A** and **12C** to thereby raise the portions of the upper margins that are roughed during the remainder of the machine cycle into the horizontal plane **266**.

The angle **264**, through which the shoe assembly can be laterally tilted, may be regulated by means of adjustable stops that are not shown.

The degree to which the base **30** is swung along the arcuate tracks **26** from its prone position to its inclined position is regulated by adjustment of the threaded spindle **48** which coacts with the stop **46**. In this manner, the extent of swinging of the shoe assembly may be adjusted in relation to the heel height of the shoe assembly.

As previously alluded to, the length of the shoe assembly is automatically taken into account when the shoe assembly is mounted on the machine in the following manner. The motor **100** causes the foot **104** to move towards the toe of the shoe assembly until the toe stop **138** engages said toe, after which the foot **104** is locked to the base **30**. Since during this movement of the foot **104**, pursuant to which the length of the shoe assembly is determined, the guide element **150** is concomitantly moved along with the cams **174**, **176**, **178** and **180** by means of the engagement of the follower **154** with the nose **152** and the cams are then firmly locked in place by the trunnion **164**, an automatic adjustment of the train of motion of the upper margin **210** past the roughing brush **198** takes place. At the end of the machine cycle, when the shoe assembly is removed from the machine, the motor **100** is so actuated as to move the foot **104** away from the post **52**. At the same time as the foot **104** is moved away from the post **52**, the motor **172** is vented so that the return spring **170** causes the locking trunnion **164** to be disengaged from the guide bar **156**. In addition, at the same time as the foot **104** is moved away from the post **52**, pressurized air again enters the motor **162** to cause the guide bar **156** to move the guide element **150** and the cams **174**, **176**, **178** and **180** back to their idle positions. Because of the aforementioned coupling between the foot **104** and the guide element **150** formed by the nose **152** and the follower **154**, the base **30** can freely swing between its prone and inclined positions without being interfered with by the guide element **150**.

There follows a recapitulation of the machine parts and the mode of operation of the machine that are pertinent of this invention.

The machine is intended to rough the upper margin **210** of the shoe assembly, the shoe assembly being comprised of the last **94** having the insole **208** located on its bottom and the upper **206** mounted thereon with the upper margin **210** lying against and being secured to the bottom of the insole. The members **72**, **90** form a first shoe assembly supporting element and the member **124** forms a second shoe assembly supporting element, the two shoe assembly supporting elements collectively forming a support for supporting the shoe assembly bottom-up. The fork tines **202** form a margin sensor engageable with the upper margin. The feeler roll **204**, located below the margin sensor **202**, forms a side sensor that is engageable with the side of the shoe assembly. The roughing tool **198** is located inwardly of the side sensor **204** and proximate to the margin sensor **202** and is engageable with the upper margin to rough the

upper margin. Both sensors **202** and **204** and the roughing tool **198** are mounted for unitary heightwise movement and for unitary inward-outward movement in a particular direction by means shown in U.S. Patent Application Ser. No. 694,005. Means, shown in U.S. Patent Application Ser. No. 694,005 so move the support as to move succeeding upper margin portions past the margin sensor **202** and as to move corresponding succeeding side portions of the shoe assembly past the side sensor **204** to thereby move the margin portions past the roughing tool **198**. As disclosed in U.S. Patent Application Ser. No. 694,005, the machine incorporates means enabling the margin sensor **202** to move heightwise and follow the contour of the upper margin portions to thereby enable the roughing tool **198** to move heightwise accordingly and means enabling the side sensor **204** to move inwardly-outwardly in said particular direction and follow the contour of the shoe assembly side portions to thereby enable the roughing tool **198** to move inwardly-outwardly accordingly.

In accordance with the first species of the invention, the arcuate tracks **26** form means mounting the support for rocking movement between a first position, shown in FIG. **3**, and a second position, shown in FIG. **4**. Pressurized air entering the motor **36** through the line **228** acts as means for initially retaining the support in its first position. The engagement of the actuating cam **178** with the valve actuating member **192** acts as means, effective during the support movement, to rock the support from its first position to its second position.

In accordance with the second species of the invention, the guide surface **72** and the guide element **122** form means mounting the support for rocking movement between the positions shown in FIGS. **12A** and **12C** and in FIGS. **12B** and **12D**, one of these positions being a first position and the other of these positions being a second position. Pressurized air entering the motors **60** and **112** through either the ports **84** and **128** or through the ports **86** and **126** acts as means for initially retaining the support in its first position. The engagement of the cam **252** with one of the control valves **250, 251** acts as means, effective during the support movement, to rock the support from its first position to its second position.

In both species of the invention, the rocking of the support from its first position to its second position ensures that, regardless of any changes in the planes in which succeeding margin portions lie or any changes in the contours of the succeeding margin portions, a line extending from the area of engagement of the roughing tool **198** with each margin portion along the surface of the margin portion to the outer periphery of the margin portion towards the area of the engagement of the side sensor **204** with the corresponding portion of the side of the shoe assembly will be substantially parallel to said particular direction.

Reverting to the first species of the invention, the heel and forepart portions of the shoe assembly bottom lie in intersecting planes. The means for so moving the support as to move the margin portions past the roughing tool **198** comprises, as shown in U.S. Patent Application Ser. No. 694,005, means for so rotating the support **180** degrees about a vertical axis in a particular rotational direction as to rotate a first end (herein disclosed as the heel end) of the upper margin **210** past the roughing tool **198**, means for thereafter so horizontally moving the support linearly as to move a side of the upper margin **210** past the roughing tool **198**, and means for thereafter so rotating the support **180** degrees in said particular rotational direction about the vertical axis as to rotate the second end (herein disclosed as the toe end) of the upper margin **210** past the roughing tool **198**. The arcuate tracks **26**, which mount the support for rocking movement, are so constructed as to rock the support about the horizontal axis **230** that is transverse to the direction of linear movement of the support. The engagement of the actuating cam **178** with the valve actuating member **192** acts as triggering means actuable pursuant to the linear movement of the support for effecting the rocking of the support. The end of the shoe assembly bottom corresponding to the first end of the upper margin lies in a substantially horizontal plane when the support is in its first position and the end of the shoe assembly corresponding to the second end of the upper margin lies in a substantially horizontal plane when the support is in its second position.

The support is moved past the roughing tool **198** in the manner described above by mechanism that includes the turntable **16** mounted for rotation about the vertical axis and the slide **18** mounted to the turntable for linear horizontal movement between two end positions. The shoe assembly support is mounted to the slide by means of the post **52** and the foot **104**. By the mechanism disclosed in Patent Application Ser. No. 694,005, the slide **18** is initially located at one of its end positions, the turntable **16** is thereafter rotated 180° in the particular rotational direction to effect the first mentioned rotation of the support, the slide is thereafter linearly moved from the first end position to the other end position to effect the horizontal linear movement of the support, and the turntable **16** is thereafter rotated 180° in the particular rotational direction to effect the second mentioned rotation of the support. The support is mounted for rocking movement by way of the base **30** mounted to the slide **18** for rocking movement with respect to the slide about the horizontal axis **230** between the prone position shown in FIG. **3** in which it is initially located and the inclined position shown in FIG. **4**, and the support is mounted to the base **30** by means of the post **52** and the foot **104** to thereby mount the support to the slide **18**. The means for rocking the support and the triggering means comprise the actuating cam **178**, which acts as an actuating member, mounted to the slide **18** for linear movement therewith, the valve actuating member **192**, which acts as a control member, mounted to the turntable **16** in intersecting relationship with the actuating member **178**, and means that includes the motor **36** responsive to the intersection of the actuating member **178** with the control member **192** for imparting movement of the base **30** from its prone position to its inclined position. The motor **36** constitutes a yieldable drive means that is mounted to the slide **18** and is connected to the base **30**.

The spindle **48** constitutes a first stop member adjustably mounted to the slide **18** and the stop **46** constitutes a second stop member mounted to the base **30** in intersecting relationship with the first stop member **48**. The intersection of the stop members during the movement of the base **30** from its prone position determines the inclined position of the base.

The position of engagement of the toe stop **138** with the toe end of the shoe assembly when the toe stop **138** is moved towards the toe end of the shoe assembly by the motor **100** together with the mechanism shown in U.S. Patent Application Ser. No. 694,005 constitutes means that adjust the extent of the linear movement of

the shoe assembly support an amount that is proportional to the length of the shoe assembly. The positioning of the actuating cam **178** a variable distance from the valve actuating member **192**, prior to the linear movement of the shoe assembly support, that is proportional to the length of the shoe assembly provides such a construction of the triggering means as to cause it to be actuated after the shoe assembly support has moved linearly an amount that is proportional to the length of the shoe assembly.

The means mounting the shoe assembly support to the slide **18** comprises: the post **52** mounted to the slide **18**; the shoe assembly supporting element, constituted by the members **72, 90** forming part of the shoe assembly support, mounted to the post; the foot **104** mounted to the slide **18** for movement towards and away from the post **52**; the shoe assembly supporting element, constituted by the toe pad **124**, mounted to the foot; and means, comprised of the motor **100**, for moving the foot towards the post an amount such as to space the foot from the post at a working position, determined by the engagement of the toe stop **138** with the toe end of the shoe assembly, whose distance from the post is proportional to the length of the shoe assembly. An arrangement for causing the extent of the linear movement of the slide to be proportional to the spacing of the foot from the post, as disclosed in U.S. Patent Application Ser. No. 694,005, is incorporated in the machine. The means mounting the post **52** and the foot **104** to the slide **18** comprises means rigidly mounting the post **52** to the base **30** and means mounting the foot **104** to the base **30** for movement towards and away from the post **52**. The machine also incorporates: means, constituted by the motor **162**, for initially maintaining the actuating member **178** in an idle position relatively remote from the post **52**; cooperative engaging members, constituted by the follower **154** and the nose **152**, respectively mounted to foot **104** and the actuating member **178**, operable to move the actuating member **178** towards the post **52** pursuant to the movement of the foot **104** towards the post **52**; and means, constituted by the cooperating teeth on the trunnion **164** and the guide bar **156**, for locking the actuating member **178** to the slide **18** when the foot **104** has arrived at its working position. The engaging members **152, 154** are so constructed and arranged that the engaging member **154** mounted to the foot **104** may move away from the engaging member **152** mounted to the actuating member **178** pursuant to the movement of the base **30** from its prone position to its inclined position. The means locking the actuating member **178** to the slide **18** comprises: a first brake element, constituted by the guide bar **156**, mounted to the actuating member for movement therewith; a second brake element, constituted by the locking trunnion **164**, mounted to the slide **18** for movement towards and away from the first brake element **156**; and means, constituted by the motor **172**, for causing the second brake element **164** to engage the first brake element **156** when the foot **104** has arrived at its working position.

Reverting to the second species of the invention, the means for so moving the support as to move the margin portions past the roughing tool **198** comprises, as shown in U.S. Patent Application Serial No. 694,005, means for so horizontally moving the support linearly in a first direction as to move a first side of the upper margin past the roughing tool **198**, means for thereafter so rotating the support 180° about a vertical axis as to rotate an end of the upper margin (herein disclosed as the toe end) past the roughing tool **198**, and means for thereafter so horizontally moving the support linearly in a second direction opposite to the first direction as to move the second side of the upper margin past the roughing tool **198**. The means mounting the support for rocking movement is so constituted as to enable the support to be rocked through an upwardly concave arc whose center of curvature lies on the horizontal axis **82** or **130** that is parallel to the directions of the linear movements. The first position of the shoe assembly, shown in FIGS. **12A** and **12C**, is such that the support is tilted about said horizontal axis **82** or **130** on one side of the vertical axis of the support and the second position of the shoe assembly, shown in FIGS. **12B** and **12D**, is such that the support is tilted about said horizontal axis **82** or **130** on the other side of the vertical axis of the support. The means for rocking the support from its first position to its second position is comprised of triggering means, that include the cam **252** and the valve **250**, that is actuable pursuant to the support rotation to effect the rocking.

Similarly to the first species of the invention, the means for so moving the support as to move the margin portions past the roughing tool comprises: the turntable **16** mounted for rotation about the vertical axis; the slide **18** mounted to the turntable **16** for linear horizontal movement between two end positions; means comprised of the post **52** and the foot **104** mounting the support to the slide **18**; and means shown in U.S. Patent Application Ser. No. 694,005 for initially locating the slide at a first one of the end portions, for thereafter moving the slide **18** from its first end position to its second end position to effect the horizontal linear movement of the support in its first direction, for thereafter rotating the turntable **180** degrees about the vertical axis to effect the support rotation, and for thereafter linearly moving the slide **18** horizontally from its second end position to its first end position to effect the horizontal linear movement of the support in its second direction. The triggering means comprises: the cam **252** that forms an actuating member mounted to the turntable **16**; the valve **250** that forms a control member so located as to be intersected by the actuating member **252** during the turntable rotation; and means, comprised of the pilot line **260**, the valve **262**, and pressurized air passing from the valve **262** to the motors **60** and **112**, that are responsive to the intersection of the actuating member **252** with the control member **251** for effecting the rocking of the support from its first position to its second position.

The machine includes the post **52** and the foot **104** mounted to the slide **18**. The support comprises a first shoe assembly supporting element, formed of the members **72** and **90**, mounted to the post **52** and a second shoe assembly supporting element, formed of the toe pad **124**, mounted to the foot **104**. The means mounting the support for rocking movement comprises means, formed of the guide surface **74**, mounting the first shoe assembly supporting element **72, 90** to the post **52** for movement through the upwardly concave arc and means, formed of the guide element **122**, mounting the second shoe assembly supporting element **124** to the foot **104** for movement through the upwardly concave arc. The means for rocking the support comprises: first powered means, comprised of the motor **60**, mounted to the post **52** and so connected to the first shoe assembly supporting element **72, 90** as to move the first shoe supporting element **72, 90** through its upwardly con-

cave arc in response to actuation of the first powered means **60**; second powered means, comprised of the motor **112**, mounted to the foot **104** and so connected to the second shoe assembly supporting element **124** as to move the second shoe assembly supporting element **124** through its arc in response to actuation of the second powered means; and means, comprised of the pilot line **260**, the valve **262**, and pressurized air passing from the valve **262** to the motors **60** and **112**, responsive to the intersection of the actuating member **252** with the control member **251**, to actuate the first powered means **60** and the second powered means **112**.

Terms such as "vertical" and "horizontal" are not intended to be literally construed but are intended to define relative relationships. Therefore, constructions that have such relative relationships are deemed to come within the combinations defined in the appended claims if they otherwise have the claimed combinations regardless of whether such constructions literally have such relationships.

I claim:

1. A machine for roughing the margin of an upper of a shoe assembly, said shoe assembly comprising a last having an insole located on its bottom and the upper mounted thereon and being secured to the bottom of the insole, the heel and forepart portions of the shoe assembly lying in intersecting planes, comprising: a shoe assembly support for supporting the shoe assembly bottom-up; a margin sensor engageable with the upper margin; a side sensor, located below the margin sensor, engageable with the side of the shoe assembly; a roughing tool located above the support, inwardly of the side sensor, and proximate to the margin sensor and engageable with the upper margin to rough the upper margin; means mounting both sensors and the roughing tool for unitary heightwise movement; means mounting both sensors and the roughing tool for unitary inward-outward movement in a particular direction; support moving means for so moving the support as to move succeeding upper margin portions past the margin sensor and as to move corresponding succeeding side portions of the shoe assembly past the side sensor to thereby move said margin portions past the roughing tool, said support moving means comprising means for so rotating the support **180** degrees about a vertical axis in a particular rotational direction as to rotate a first end of the upper margin past the roughing tool, means for thereafter so horizontally moving the support linearly as to move a side of the upper margin past the roughing tool, and means for thereafter so rotating the support **180** degrees about said vertical axis in said particular direction as to rotate the second end of the upper margin past the roughing tool; means enabling the margin sensor to move heightwise and follow the contour of said upper margin portions to thereby enable the roughing tool to move heightwise accordingly; and means enabling the side sensor to move inwardly-outwardly in said particular direction and follow the contour of said side portions to thereby enable the roughing tool to move inwardly-outwardly accordingly; the machine having the improvement comprising: means mounting the support for rocking movement between a first position and a second position about a horizontal axis that is transverse to the direction of said linear movement; means for initially retaining the support in said first position wherein the end of the shoe assembly bottom corresponding to said first end of the upper margin lies in a substantially horizontal plane; and triggering means actuable pursuant to said linear movement for rocking the support from its first position to its second position wherein the end of the shoe assembly bottom corresponding to said second end of the upper margin lies in a substantially horizontal plane; whereby a line extending from the area of engagement of the roughing tool with each portion of the ends of the upper margin along the surface of the engaged margin to the outer periphery of the margin portion and towards the area of engagement of the side sensor with the corresponding portion of the side of the shoe assembly will be substantially parallel to said particular direction.

2. The machine of claim **1** wherein the means for so moving the support as to move said margin portions past the roughing tool comprises: a turntable mounted for rotation about said vertical axis; a slide mounted to the turntable for linear horizontal movement between two end positions; means mounting the support to the slide; means initially locating the slide at a first one of said end positions; means for thereafter rotating the turntable **180** degrees in said particular rotational direction to effect said first mentioned rotation of the support; means for thereafter linearly moving the slide from said first one of said end positions to the other end position to effect said horizontal linear movement of the support; and means for thereafter rotating the turntable **180** degrees in said particular rotational direction to effect said second mentioned rotation of the support; the machine having the improvement wherein said means mounting the support for rocking movement comprises: a base mounted to the slide for rocking movement with respect to the slide about said horizontal axis between a prone position in which it is initially located and an inclined position; and means mounting the support to the base; and the machine having the further improvement wherein said means for rocking the support and said triggering means comprise: an actuating member mounted to the slide for linear movement therewith; a control member mounted to the turntable in intersecting relationship with the actuating member; and means responsive to the intersection of the actuating member with the control member for imparting movement of the base from its prone position to its inclined position.

3. The machine of claim **2** having the improvement wherein the means for imparting said movement of the base comprises: yieldable drive means mounted to the slide and connected to the base.

4. The machine of claim **3** having the improvement comprising: a first stop member adjustably mounted to the slide; and a second stop member mounted to the base in intersecting relationship with the first stop member; the intersection of the stop members during said movement of the base determining the inclined position of the base.

5. The machine of claim **1** further comprising: means adjusting the extent of the linear movement of the support an amount that is proportional to the length of the shoe assembly, the machine having the improvement wherein the triggering means is so constructed as to be actuated after the linear movement of the support an amount that is proportional to the length of the shoe assembly.

6. The machine of claim **2** wherein said means mounting the shoe assembly support to the slide comprises: a post rigidly mounted to the slide; a shoe assembly supporting element, forming part of said shoe assembly support, mounted to the post, a foot mounted to the

slide for movement towards and away from the post; a shoe assembly supporting element, forming part of said shoe assembly support, mounted to the foot; and means for moving the foot towards the post an amount such as to space the foot from the post at a working position whose distance from the post is proportional to the length of the shoe assembly; the machine further comprising: means for causing the extent of the linear movement of the slide to be proportional to the spacing of the foot from the post; the machine having the improvement wherein said means mounting the post and the foot to the slide comprises: means rigidly mounting the post to the base; and means mounting the foot to the base for said movement towards and away from the post; and the machine having the further improvement comprising: means initially maintaining the actuating member in an idle position relatively remote from the post; cooperative engaging members mounted to the foot and the actuating member operable to move the actuating member towards the post pursuant to the movement of the foot towards the post; and means locking the actuating member to the slide when the foot has arrived at its working position; said engaging members being so constructed and arranged that the engaging member mounted to the foot may move away from the engaging member mounted to the actuating member pursuant to the movement of the base from its prone position to its inclined position.

7. The machine of claim 6 having the improvement wherein said means locking the actuating member to the slide comprises: a first brake element mounted to the actuating member for movement therewith; a second brake element mounted to the slide for movement towards and away from the first brake element; and means for causing the second brake element to engage the first brake element when the foot has arrived at its working position.

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UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 4090378

DATED : May 23, 1978

INVENTOR(S) : Gerald Sommer

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

The number of the first reference on the cover sheet under "U.S. PATENT DOCUMENTS" should be --3,163,031-- instead of "2,163,031" and the name of the patentee of this reference should be --Kestell-- instead of "Kostell".

Signed and Sealed this

Thirty-first Day of *October 1978*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

DONALD W. BANNER
Commissioner of Patents and Trademarks